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**Search Results** - Record(s) 1 through 4 of 4 returned.

☐ 1. Document ID: US 6336096 B1

L11: Entry 1 of 4 File: USPT Jan 1, 2002

US-PAT-NO: 6336096
DOCUMENT-IDENTIFIER: US 6336096 B1

TITLE: System and method for evaluating liability

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

☐ 2. Document ID: US 6173068 B1

L11: Entry 2 of 4 File: USPT Jan 9, 2001

US-PAT-NO: 6173068
DOCUMENT-IDENTIFIER: US 6173068 B1

TITLE: Method and apparatus for recognizing and classifying individuals based on minutiae

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

☑ 3. Document ID: US 5950169 A

L11: Entry 3 of 4 File: USPT Sep 7, 1999

US-PAT-NO: 5950169
DOCUMENT-IDENTIFIER: US 5950169 A

TITLE: System and method for managing insurance claim processing

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

☑ 4. Document ID: US 5557515 A

L11: Entry 4 of 4 File: USPT Sep 17, 1996

US-PAT-NO: 5557515
DOCUMENT-IDENTIFIER: US 5557515 A

TITLE: Computerized system and method for work management

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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| Terms | Documents |
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| L9 and (injur$3 or damag$3) same (value or amount) | 4 |

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**Search:** L11

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## Search History

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|---|---|---|---|
| | *DB=USPT; PLUR=YES; OP=ADJ* | | |
| L11 | L9 and (injur$3 or damag$3) same (value or amount) | 4 | L11 |
| L10 | L9 and bod$3 same (injur$3 or damag$3) same (value or amount) | 0 | L10 |
| L9 | L8 and select$3 | 30 | L9 considered all |
| L8 | L5 and (display$3 or view$3) | 32 | L8 |
| L7 | L5 and (display$3 or view$3) same (intermediary or medium averag$3) same step$ | 0 | L7 |
| L6 | L5 and (display$3 or view$3) same (select$6 or partit$6) same list$3 same order$3 | 1 | L6 |
| L5 | L2 and (step$ or procedure$ or cod$3 or fil$3 or loop$3 or flowchart$3) | 38 | L5 considered all |
| L4 | L2 and (step$ or procedure$ or cod$3 or fil$3 or loop$3 or flowchart$) | 38 | L4 |
| L3 | L2 and (step$ or procedure$) same (table content or toc) | 0 | L3 |
| L2 | L1 and estimat$3 | 38 | L2 |
| L1 | (process$3 or calculat$$) same insurance adj claim$6 | 106 | L1 |

END OF SEARCH HISTORY

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L9: Entry 20 of 30 File: USPT Sep 7, 1999

DOCUMENT-IDENTIFIER: US 5950169 A
TITLE: System and method for managing insurance claim processing

INVENTOR (7):
Stephen; Kelly

Inventor Group (7):
Stephen; Kelly Riverside CA

Abstract Text (1):
A system and method for managing and processing insurance claims is provided that implements an object oriented graphic user interface. The system includes at least one remote computer for entering and viewing insurance claim information. A wide area network capable of communicating with the remote computer and a computer in communication with said wide area network are also included. An insurance datafile, generated at said remote computer, is transferrable over the network. The method includes the steps of transmitting a claim assignment from an insurance office computer to a mailbox in a communications server, retrieving the assignment at a remote computer and generating an insurance claim datafile containing all data pertinent to an insurance claim and allowing for bidirectional transmission of the datafile over a wide area network. A graphic user interface for use in managing an insurance claim from an initial claim to final settlement is also included. The interface has common workflow objects such as an in box, an in process box, and an out box, for managing and manipulating one or more workfiles.

Parent Case Text (2):
This application is a continuation-in-part of application Ser. No. 08/437,773 filed May 9, 1995, entitled INSURANCE CLAIMS ESTIMATE COMPARISON SYSTEM AND METHOD, which is a continuation-in-part of application Ser. No. 08/063,790 filed May 19, 1993, now U.S. Pat. No. 5,504,674. The above-referenced application, in its entirety, is incorporated herein by reference.

Brief Summary Text (2):
A Microfiche Appendix of the presently preferred source code is attached and comprises 49 sheets having a total of 4715 frames. The Microfiche Appendix contains material which is subject to copyright protection. The copyright owner has no objection to the facsimile reproduction by anyone of the Microfiche Appendix, as it appears in the Patent and Trademark Office patent files or records, but otherwise reserves all copyright rights whatsoever.

Brief Summary Text (5):
Insurance companies generally process a claim by performing a number of related tasks that include numerical cost estimates, information management, and communications between, for example, insurance company offices and employees in the field. The sum of tasks performed in claims processing define a workflow that must be accommodated in the insurance industry. Existing methods and systems for handling insurance claims are typically limited to undertaking only one or a few of the daily tasks that make up insurance claim workflow. For example, some methods are limited to calculation of a specific type of damage or injury and generating an estimate for repairing or replacing the damaged or injured item.

Brief Summary Text (6):
The calculation of a repair cost estimate is often done on a computer by entering reference data from external sources. The computer program may generate a numerical value as a result of looking at the data from the external sources and comparing it to the items that need to be replaced or repaired. In one estimating system, a vehicle

claim estimate related to car panel and chassis damage is calculated and provided to a user. In another system, an auto bodyshop generates an estimate, including a digitized image of the vehicle, that may be transmitted via modem to an insurance company. Other tasks necessary to insurance claims processing, such as communication between an insurance company and repair facilities or managing of correspondence are typically handled separately.

Brief Summary Text (7):
The various available methods and systems for generating insurance costs and estimates are typically further limited to individual discrete calculations. After an appraiser prepares an estimate for repairing a vehicle, a separate calculation is often completed through a separate computer program to compute total loss valuation of a vehicle. Although these individual calculations may be obtained through separate programs, the results of each of the programs are difficult or awkward to compare because of the separate programs and datafiles involved.

Brief Summary Text (8):
Similarly, although separate methods and systems for performing some of the administrative tasks in insurance claim processing workflow are available, each of these separate computer programs requires certain types of data and each outputs a certain type of data. The data required for the separate programs may overlap and lead to redundant data entry tasks being performed. Data sharing between the different, discrete methods and systems that an insurance company uses may be difficult due to incompatible data formats. Therefore, an insurance claim adjuster must spend time keeping track of, and running, the separate programs. Appraisers, repair shops, and others involved in claim processing often need to switch between, and learn how to operate, separate software programs having separate data and interface requirements. Present methods of handling insurance claims not only tend to require the use of separate software and hardware tools for various calculations, but also require separate organization of administrative material and client mailings to the insured party. Insurance companies often juggle many separate computer files and pieces of paper generated for each claim.

Brief Summary Text (9):
Accordingly, there is a need for a comprehensive system and method of managing an insurance claim work flow wherein all the tasks of processing a claim may be performed and evaluated. Such a system would have a common user interface to access the various calculation tools and administrative steps. It would also be advantageous to have a centralized electronic datafile containing all data relevant to a claim that would eliminate the need for separate paper files or datafiles and eliminate the need for wasteful reentry of existing data.

Brief Summary Text (11):
The present invention provides for a comprehensive method and system for processing insurance claims for use by insurance companies as well as appraisers, repair shops, salvage yards and other support industries related to insurance claim processing and resolution. One aspect of the present invention includes a method having the steps of first providing a remote computer and a computer in the home office of an insurance company that are in communication over a wide area network. An insurance claim datafile containing all data pertinent to an insurance claim is generated at the remote computer. A user transfers the datafile between the home office computer and at least one remote computer while the claim is being processed. A user modifies and builds sections of the insurance claim datafile at the remote computer based on information accessed from an external source such as a memory device or another computer.

Brief Summary Text (12):
In a preferred embodiment, the datafile contains data on the insured, including policy information; data on a claim, such as the extent of damage or injury; and data on satisfying a claim including repair estimates and total loss valuation of, for example, an automobile. Further, the preferred method includes the additional step of generating an event log that tracks all actions taken on a claim datafile. The method also preferably includes monitoring calculations of repair costs to determine if the repairs are approaching or exceeding the total loss valuation of a vehicle.

Brief Summary Text (15):
One advantage of the presently preferred embodiment is that a single user, who previously had to master and juggle numerous programs and pieces of paper, may accomplish all the necessary insurance processing tasks using a single program that holds all claim information in a file in a single database. Other advantages, stemming

from the common graphic user interface and single insurance claim workfile, are the elimination of redundant data entry and the ability to view separate calculations at the same time. Further, the entire administrative management of claim processing is aided through the preferred event log section of the insurance claim datafile.

Drawing Description Text (10):
FIGS. 9-12 are additional information screens illustrating the steps and information used to calculate a repair estimate including comparisons of OEM, aftermarket and recycled parts.

Drawing Description Text (12):
FIG. 16 is a flow chart of steps taken to repair a driveable vehicle in a DRP repair facility.

Drawing Description Text (13):
FIG. 17 is a flow chart of steps taken to repair a driveable vehicle in a non-DRP repair facility.

Drawing Description Text (14):
FIG. 18 is a flow chart of steps taken to repair a non-driveable vehicle in a DRP repair facility.

Drawing Description Text (15):
FIG. 19 is a flow chart of steps taken to repair a non-driveable vehicle in a non-DRP repair facility.

Drawing Description Text (16):
FIG. 20 is a flow chart of a preferred method of estimating vehicle repair costs.

Drawing Description Text (17):
FIG. 21 is a flow chart of a preferred total loss procedure.

Drawing Description Text (18):
FIG. 22 is a flow chart of a preferred estimate requires supplement procedure.

Detailed Description Text (3):
The present invention provides a new and improved method and apparatus for processing claims, typically in an insurance environment. The concept of work flow is introduced, which not only includes calculation of a repair estimate but also includes total loss valuation, settlement, and paperless file management. The present method accomplishes claim processing by controlling the electronic transfer of files between various remote computers, including those located at vendors, body shops, salvage yards, insurance company, and other terminals which may be used in an insurance processing environment. A particular insurance claim to be processed is defined herein as a workfile. Each workfile represents one particular claim. A workfile can have a number of entries which would depend on a particular application. The following description is focussed on automobile claim processing but may equally apply to other types of insurance claim processing.

Detailed Description Text (4):
The presently preferred system provides a user with the networking capability for transferring all or part of the workfile between computers. Thus, a repair shop sends a workfile to the network which may in turn provide several cost estimates for parts, including OEM, after-market, and salvage values. Similarly, an insurance adjuster can send a workfile to a repair shop to facilitate the repair process. Protocol and formats for handling transmission of the workfile may be adjusted by the user within an "in box" and an "out box" provided in a preferred graphic user interface.

Detailed Description Text (5):
The workfile contains all the necessary information for field processing of insurance claims. This information includes administrative information that details the loss involved, the type of inspection done, any information from the inspection, and the particular adjuster assigned the claim. Policy information including the party names, statements from those at the scene and a chosen or preferred repair site for the vehicle is maintained with the administration information. The datafile also retains vehicle information describing the vehicle, identification, year, make, model, style and engine as well as options of the vehicle. Repair estimates are also contained in the workfile for repair including prior damage information, reference to recycled parts original equipment manufacturer (OEM) parts and repaired parts. The workfile retains

further information related to taxes, labor rates, discounts, and other expenses involved in repairing a vehicle.

Detailed Description Text (6):
As shown in FIG. 1, a generic claim processing workflow is illustrated. The claim workflow shown in FIG. 1 is tailored specifically for automobile insurance claims. Other types of insurance such as property or health insurance may also be mapped into the claim workflow shown in FIG. 1. According to a presently preferred embodiment, a work assignment 10 is received by a claims adjuster after an accident has been reported. A vehicle inspection 12 is then conducted to determine the extent of damage to the insured vehicle.

Detailed Description Text (7):
After the vehicle inspection has been recorded, at least two calculations may be made with regard to the vehicle. First, information from the vehicle inspection is used to determine a vehicle valuation 14 which values the vehicle based on several factors including age of the vehicle and prior damage. A damage estimate 16 is also made of the vehicle to attempt to define the repairs necessary to bring the vehicle back to its previous state. If the repair estimate approaches the vehicle valuation, the adjuster may decide to total out the vehicle.

Detailed Description Text (8):
The next step is then to determine salvage disposition 18. Salvage disposition refers to bids made by local salvage parts lots for purchasing the remainder of the vehicle should it be totaled out by the adjuster. The numbers from the damage estimate and from the vehicle valuation, including salvage disposition, are then used by an adjuster who looks at these numbers to determine what type of settlement and/or adjustment 20 should be made. The final step of the claim processing chain is to pay out 22 to the insured the repair costs or the total loss amount.

Detailed Description Text (10):
Another section of the workfile relates to total loss calculations. The total loss calculation involve evaluations based on salvage disposition and present worth of the vehicle based on estimates such as blue book evaluations. Also, settlement information related to rental cars, towing, credit allowance and the like are included in the workfile. An event log logging the date, time and task performed by an adjuster or insurance company employees is included. The event log may contain automated or manually entered events. The event log, which is automatically appended to the workfile, allows supervisors to track and manage claim cycle times. In addition, the workfile holds all notes, form letters, reports and rate tables that are related to the claim the workfile represents.

Detailed Description Text (11):
A system 28 for executing a preferred method of managing insurance claims processing is shown in FIG. 3. The system 28 preferably comprises computer terminals or networks at an insurance company home office 30, a local claims office 32 and an auditor 34. Each of these computers is in communication with a communication server 36 over a communication line 37 such as telephone lines or wireless communications facilities. The communication server 36 may be a specialized server dedicated to insurance claim management, such as the EZNET server provided by CCC Information Services, Inc., or a general wide area network provider such as America On Line (AOL). The server 36 preferably has a plurality of flexible memory locations, or mailboxes, for storing insurance datafiles and communications. Computers located at an appraiser 38, direct repair program (DRP) facility 40, or independent appraiser 42 are also in communication with the server 36 over a communication line. The computer of the home office 30 preferably holds the mastercopy of each insurance datafile unless the assigned appraiser 38, DRP shop 40 or independent appraiser 42 is working on the specific insurance claim assignment associated with a datafile.

Detailed Description Text (12):
Each computer in the system 28 preferably has a processor, a display monitor, and memory. The processor, display monitor and memory may be embodied as an IBM-compatible personal computer. The memory may be embodied as a mass storage device. The processor is coupled to the mass storage device and display monitor. The mass storage device may be a hard disk, compact disk, optical disk or other computer storage device. The mass storage device may also be used for archiving data.

Detailed Description Text (13):
The main memory includes a video memory which stores display format information which

is displayed on the display monitor. The information stored in the video memory is used to refresh the display on the display monitor. The information may be text, graphics, or a combination thereof. The mass storage device stores a data base of text and graphics images that may be in compressed digital form. The digital data stored in the memory includes a database containing information on a plurality of automobiles including illustrations and replacement costs. The replacement cost, as the term is used here, refers to costs typically encountered for repairing or replacing parts and/or groups of parts of the damaged objects. These costs may include amounts needed for parts, labor, painting, edging, underside, refinishing, etc. The data base may include, for example, the replacement parts, times, procedures and footnotes for automobiles. Both the text and graphics may be stored in compressed form. The compressed graphics may use PCX, TIFF or other graphics image formats.

Detailed Description Text (14):
As described above, the computer at each location may be a single user system such as shown in FIG. 4 or a multi-user system as seen in FIG. 5. The single user system 44 may comprise a computer having a floppy disk drive 46, a tape backup drive 48 and a CD ROM drive 50. The single user unit preferably has a processor that may be used in an IBM-compatible personal computer 52 and uses internal memory 54 consisting of at least 12 megabytes of RAM and, optionally, a 256 kilobyte cache of speed enhancement memory 68. A hard drive memory 56 is also preferred. The user of the single user system interacts with insurance claims files via a monitor 58, a keyboard 60 and a computer mouse 62. Other input devices such as computer pens or touch screens may also be used. Optionally, a printer 64 may be used to print out reports. The single user system 44 communicates with other databases and other computers via a modem 66, which may be internal or external, connected to a wide area network over regular telephone lines. The single user workstation may also be a laptop or other portable type computer for ease of use by field appraisers and adjusters.

Detailed Description Text (16):
According to a preferred embodiment of the present invention, another computer configuration for use with the present method is shown in FIG. 5. The system shown in FIG. 5 is a local area network 72 connecting several computer workstations. The local area network preferably has a file server 74 connected to a primary workstation 76 and one or more secondary computer workstations 78. The individual workstations and file server are all connected via a communications line such as an ethernet coaxial network cable 80. The file server 74 may comprise a computer having at least one floppy drive of preferably 1.44 megabyte capacity, a CD ROM drive and a hard drive such as a 2 gigabyte SCSI drive. The computer preferably also includes a processor suitable for use in IBM-compatible personal computers, such as the PENTIUM.RTM. processor manufactured by INTEL Corp., and an internal memory that may have 32 megabytes of RAM. A network connection such as a network card is also included. The primary computer workstation 76 also may comprise a computer having a floppy drive, a hard drive, a processor such as those suitable for use in an IBM-compatible personal computer, and an internal memory such as 16 megabytes of RAM. Also included in the primary workstation 76 are a network card and a fax modem. On each computer in the network 72, a user views datafiles and other insurance claim processing information through a monitor and can enter and extract data via a keyboard, computer mouse, or pen attached to the computer.

Detailed Description Text (18):
Each remote computer, whether a single user computer or a computer in a local area network, provides an interface for a user to access the assigned or pertinent claim workfile. The user interface not only comprises a video display of monitor, but also includes a universal display screen. The universal display screen, preferably a graphic user interface, displays at least one workfile/datafile in addition to visual objects representative of actions to be taken on a workfile. In a preferred embodiment where the universal entry screen is the graphic user interface described above, an opened insurance claim datafile has a plurality of tabbed sections, each tabbed section representing a separate view of the datafile. A user may access each of the tabs by using a keyboard or other user input means.

Detailed Description Text (19):
As illustrated in FIG. 6, a preferred graphic user interface 82 for use with the method and system of the present invention allows an authorized user to control claims processing workflow for one or more insurance datafiles. The graphic user interface not only permits a user to enter and retrieve information from a datafile, but also permits the user to execute tasks involved in claims processing such as manipulating a plurality of claim datafiles, opening a specific claim datafile and working on estimate calculations or correspondence related to the open file. The interface also provides

for communicating with repair facilities and insurance company staff. The graphic user interface may be constructed using known software tools and languages such as VISUAL C++ produced by Microsoft Corp., RATIONAL ROSE produced by Rational Corp., and the IBM CUA Library produced by IBM, Inc.

Detailed Description Text (20):
In one embodiment, the graphic user interface 82 includes a perspective bar 84 having a plurality of user objects representing basic office workflow. The user objects represented on the display monitor mirror the objects used by a typical user in an everyday work environment. Preferably, the perspective bar 84 has an in box 86 for receiving assignments, an out box 88 for transmitting the assignments that have been processed, and an in process box 90 for holding workfiles and information that a user is working on. Access to storage locations, which may be a hard disk drive, is provided through a storage object 92. Report forms are accessible through a report object 94.

Detailed Description Text (21):
The graphic user interface also includes a tool bar 96 made up of objects 97 that allow the user to perform necessary tasks such as printing, and context sensitive buttons 98 that appear on the bar 96 when certain tasks may be required by the screen presently being viewed. According to a preferred embodiment, the context sensitive buttons 98, such as the "Delete Party" button in FIG. 6, will disappear when the screen on the display monitor does not require the option represented by the context sensitive button 98. The interface 82 also includes a menu bar 95 having one or more pull-down menus and a title bar 99, which may include general information concerning the filename of the displayed file and the user's location in the claims processing workflow.

Detailed Description Text (22):
As shown in FIG. 6, the perspective panel 84 may be selected as always visible regardless of what point of the claims processing a user is at. Regardless of whether a user is using a local area network (LAN), a wide area network (WAN) or a stand alone computer, the in box 86 retains all the mail addressed to the particular user. The out box 88, which is located on the same screen as the in box 86, is also essentially independent of the type of network or stand alone computer a user happens to be working on. Mail is sent from the out box whenever a user confirms the completion of the files contained in the out box 88. Both the in box and the out box are connected through network connections described above so that assignments, entire workfiles, and miscellaneous claim information may be passed back and forth. In one preferred embodiment, users do not have individual in and out boxes but are able to filter the contents of a central in or out box so that it may selectively view the contents. In another preferred embodiment, each individual user is assigned an in box containing only those electronic datafiles relevant to the particular user.

Detailed Description Text (23):
The in process box 90 is used for those workfiles a user is working on. A workfile remains within the in process box 90 for as long as it takes to complete the various steps or transactions required for the particular work file. This time will of course vary with the complexity of the claim that the workfile represents. When the in process icon is selected, the graphic user interface displays the number of items or work files in process, with each workfile appearing as a folder in the main screen area. Each folder is identified by the insured's name; make of the vehicle; date; and job number assigned. To open a particular workfile with a mouse, the user can either double-click on the desired folder or use the "open" button provided near the top of the screen. Keyboard access to workfiles may be achieved through use of arrow keys, the space bar and the "enter" key.

Detailed Description Text (24):
Within the in process box, an individual workfile opened for work on a display monitor is shown in FIG. 6. The workfile preferably comprises a plurality of individual sections represented by tabs 102 that designate the contents of that section. In one preferred embodiment, a section tab extension 104 is included to allow for extra sections to be referenced without cluttering up a viewer's screen. Within each of the sections of the workfile, a frame switching button bar 106 having a number of frame switching buttons is included.

Detailed Description Text (25):
Once a particular workfile in the in process box has been opened, the user is provided with the overlapping tab format, visible to a user as overlapping folders, or tab icons, summarizing categories of information applicable to the workfile. As described above, the section tabs 102 may include text and graphics designations for subjects

such as administrative information, vehicle data, total loss information, events, estimates, totals, notes, correspondence, salvage, and rates. A user may view or manipulate the data accessible in each of the tabs.

Detailed Description Text (26):
Administrative information stored in the "ADMIN" tab includes several frames 108 of information accessible through the frame switching button bar 106 inside the tab. Preferably, the information comprises assignment information, inspection information, policy information, party information, statements, loss information, and repair site information. Assignment information includes items such as the claim number, the date the claim was reported, the date the claim was assigned, and information on who received the assigned claim, e.g., the names of the insurance company, appraiser and adjuster, as well as claim office location. The example in FIG. 6 shows the "parties" frame selected. This selection reveals a number of text fields 110 for entering or viewing name, address and telephone information.

Detailed Description Text (29):
The vehicle data tab includes general descriptive information, options, and damage. Vehicle data also could include categories for additional considerations and condition. General descriptive information may be entered by the user such as vehicle identification number, year, make, type, body style, engine size, odometer reading, color, etc. A vehicle options selection allows the user to specify whether the damaged vehicle was equipped with a particular type of sunroof or other roof type, to specify whether it was equipped with power accessories, and to identify the type of transmission. Other options may also be included. Damage information includes the car's overall condition, i.e., driveable or not; areas of primary and secondary impact; and additional damage particulars. Again, the categories of information just enumerated are enterable by the user using the graphic user interface.

Detailed Description Text (30):
The total loss information tab contains information on total loss valuation such as general vehicle values by year, model, etc. A user has the option to request a more complete total loss valuation by transmitting a request for a valuation to a provider and transmitting a copy of the pertinent vehicle information with the request. The total loss value is an estimated value assigned to a damaged vehicle to generally determine if the cost to repair exceeds the total value of the vehicle. Typically, if an estimate to repair exceeded the estimated total loss value, then the insurance company usually gives the insured a money settlement and the car is salvaged. The settlement value may be a percentage of the total loss, due to a price of selling the total vehicle to a salvage parts dealer. If the total loss value were greater than the estimate of the repair, then the decision may be to repair the damaged vehicle. Thus, the total loss value is used to help determine whether a repair shop gets a job, or whether an owner of a vehicle gets a dollar settlement value for the vehicle. In a preferred embodiment, a user is informed when a repair estimate being prepared approaches an estimated total loss value. At this point, the user may send out a request for a specific total loss valuation from a third party provider that will calculate the specific value of the car.

Detailed Description Text (31):
As seen in FIG. 7, the graphic user interface also permits ease of access to information and calculations from traditionally separate insurance processing modules. For example, a total loss calculation may be directly juxtaposed with a vehicle damage estimate on the same computer screen in the "Totals" tab when the "Settlement" frame is selected. Information entered through the graphic user interface into a workfile automatically updates related calculations for the different insurance claim process used within the workfile. All aspects of the workfile in calculations regarding an insurance claim can be accessed through a single user interface. In other words, any of the tasks involved in processing an insurance claim may be addressed through the graphic user interface, examples of which are seen in FIGS. 6 and 7. All the steps shown in FIG. 1 may be managed using the different functions presented to a user in the graphic user interface.

Detailed Description Text (32):
The user interface acts to seamlessly connect the different functional modules used to calculate and process discrete steps of an insurance claim processing task. Structurally, each task may be defined as a module which connects through the interface a user to the appropriate data base or communications channel. This open ended architecture allows for expansion at a later date to include greater processing or workflow capability without the need for additional computer hardware, within the same

graphic user interface, and therefore without the need for a user to learn a new software program.

Detailed Description Text (33):
FIGS. 8A through 8L illustrate the preferred method for processing an insurance claim from inception to final settlement as was shown in FIG. 1. The presently preferred method may execute, but is not limited to, the example of insurance claim processing workflow shown in FIG. 1. One presently preferred software embodiment is included in the attached Microfiche Appendix. Referring to FIG. 8A, using a remote computer or working from a workstation in a multi-user environment, a user first logs in 150 to the computer, entering the user name and other identification. At this point a user has two options. First, the user may update system information 152 by updating the software modules 154, updating company information 156 or updating user information 158. The step of updating software modules 154 refers to entering a setup menu to, for example, customize the directory structure of the graphic user interface. Within the setup menu, company information such as a list of approved repair facilities may be updated 156. Also within the setup window, user information related to user identifications and security access may be updated 158.

Detailed Description Text (34):
The second option is to begin normal workflow processing 160 by manipulating the perspective panel 84 in the graphic user interface 82 as described above to either select the in box 162, the in process box 164, or the out box 166. Alternatively, a user may choose to store, or view stored information 168 or print out reports on specific workfiles 170. If the user chooses to select to print out certain reports the user may check a print preview 172 of specific types of forms to print out.

Detailed Description Text (35):
If the user chooses the in box selection the user then, as shown in FIG. 8C, has the option to either connect 174 to a communications server as described above or to review 176 the current items that are residing in the in box. If there are items to review in the in box, the user can discard 178 transactions from the in box which are no longer necessary or move 180 a workfile or other transaction to storage locations such as a memory in the stand-alone 44 or network computer 76.

Detailed Description Text (36):
Other options a user has while viewing items in the in box are to apply 182 a total loss user profile, attach 184 the transaction in the in box to a workfile in the in process box, or move 186 the assignment or workfile from the in box to the in process box. The transaction in the in box may be items of information, such as a total loss valuation response received from a home office computer over a network as described above. Also, the transaction may be a digitized image of the damaged vehicle transmitted from the repair or inspection facility inspecting the insured's automobile. A user may simply move the information into the appropriate workfile by dragging the icon from the in box to the in process box or using the pull down menus on the graphic user interface to merge the information onto the workfile. A user can implement the same technique to move 186 an assignment or workfile to the in process box.

Detailed Description Text (38):
Referring again to FIG. 8B if the user selected the in process box on the user interface, the user may then (FIG. 8D) open 192 an existing workfile on an insurance claim and execute the required administrative or repair estimating tasks. The user may also create 194 a new workfile. The new workfile may be created from a received assignment. As with the in box, the user may manipulate workfiles by moving 196 a workfile to the out box that has been completed or storing 198 a workfile for later reference. By opening the existing workfile or dragging a workfile from the in box to the in process box the user can then substantively alter and amend work necessary on the claim.

Detailed Description Text (39):
When an existing workfile is opened or a new workfile created, the user may next begin substantive work on the workfile. As shown in FIG. 8E, all of the various tabbed sections in a workfile as described above are available for alteration and amendment. Specifically, the user may create or edit administrative data 200, create or edit vehicle information 202, create or edit an estimate of damage 204, update an event log 206, review the totals in the workfile 208, add to or edit notes 210, edit labor rates in the workfile for the various approved repair facilities 212, begin a vehicle valuation process 214, update salvage information 216 or simply review correspondence 218. In a preferred embodiment, each of these tasks may be accomplished through the

graphic user interface described above by selecting the appropriate tabs and frame switching buttons on the computer screen.

Detailed Description Text (40):
As seen in FIG. 8F, when a user is creating a workfile for a specific claim the user begins by entering vehicle identification 220 into the workfile via the keyboard. After entering the vehicle identification data, the system automatically selects a database 222 from which to access parts lists and values for the particular vehicle. Within the database a search may be made by year, make and model of the vehicle 224 or the user may decide to have the vehicle identification number (VIN) decoded 226 in the database. The VIN number is a unique number assigned to each vehicle manufactured and also contains standard information that identifies the appropriate manufacturer make and model. Once the vehicle identification has been made and the appropriate parts database has been selected for that make model and year of the vehicle a user may select specific options available for that vehicle 228. After the proper identification and selection of options on the damaged vehicle have been made the user defines damage location 230 on the vehicle. The damage locations are defined using an illustration of a generic automobile on which number designations, corresponding to generally known areas of a car, may be selected by the user to identify the primary and secondary damage areas.

Detailed Description Text (41):
After creating or editing vehicle data, the user can go into the estimate tab of the workfile to create or edit an estimate. As shown in FIG. 8G, a user can either change estimate lines within the estimate 232, identify other charges such as towing or storage fees 234, or simply review the estimate totals for the car 236. When a user is editing or adding information to the estimate, several databases are accessed automatically. Preferably, these databases are stored in a memory device such as a hard drive attached to the computer a user is using. In one preferred embodiment the user may access an original equipment manufacturer (OEM) part database 238, a recycled part/salvage part database 240, a labor cost database 242 and an aftermarket part database 244. Suitable commercially available databases for these four databases are the MOTOR database put out by Hearst Corporation, the recycled part valuation (RPV) database of salvage parts compiled by CCC Information Services, Inc., the recycle assembly crash estimating guide (RACEG) developed by Hearst Corp, containing labor rates, and an aftermarket parts database compiled by CCC Information Services, Inc. The user may also compare the total estimate to a threshold value 246.

Detailed Description Text (42):
The system a user is working on preferably has graphics capability to show a simple parts illustration of the parts being selected from the MOTOR database. The list of groups of parts might include, for example, main parts groups such as: front bumper; frame; grill and lamps; fender and lamps; engine, transmission and axle; wheels and front suspension; front door and rear door; steering; trunk lid; rear body and lamps; fuel systems; rear suspension; rear bumper; and interior trim.

Detailed Description Text (43):
The user has the option to select, using a user input device such as a mouse, keyboard or pen, a group of parts from the parts list. The display monitor displays a parts description from the data base corresponding to the selected parts group. For example, if the front bumper is selected as the parts group, then the display presents the user with parts comprising the bumper such as a face bar; rubber strip; guard; extension; support; filler; molding; license bracket; and energy absorber. Any number of parts can be selected for repair from a particular group of parts, and any number of groups of parts may be selected.

Detailed Description Text (44):
The user may select to view 248, a parts illustration showing a parts assembly with individual parts numbered. The illustration is preferably on the same screen as the textual description of the parts. Throughout the estimate process a user may be prompted by the system that the total cost of repairing the vehicle is approaching a threshold total value for that vehicle. The threshold total valuation number is preferably derived from generic information on the model and year of car being processed. If a specific total valuation is desired then the user must request a custom total valuation report from a third party database provider such as CCC Information Services, Inc.

Detailed Description Text (45):
Referring again to FIG. 8E and the choices available to a user, an event log is

automatically and/or manually updated 206. As shown in FIG. 8H, user may manually update 250 the event log by selecting an event code from a table 252 and then adding 254 specific event information to an electronic note pad attached to the workfile. Several events are automatically updated 256 simply by activation by a predetermined trigger 258 that operates when certain tasks have been completed. The automatic updates may be configured by an authorized user.

Detailed Description Text (46):
Updated workfile totals on the estimate that has been worked on or the total valuation that was requested are available for viewing and editing by the user 208. As shown in FIG. 8I, the user that selects the totals tab in the graphic user interface of a workfile may update adjustments to the estimate 260, review repair totals 262, review the total loss values 264, or compare the repair and total loss values 266.

Detailed Description Text (47):
Within the total loss valuation tab of the user interface a user can access entry fields to organize a valuation request. The steps a user takes in creating and viewing total loss calculations are shown in FIG. 8J. Within totals tab of the user interface, a user can create 268 a valuation request including all the pertinent information a third party database company needs to create the specific total loss valuation. After entering all the necessary data, a user then submits a valuation request 270 for completion. The valuation request is preferably transferred 272 to the outbox where it will be sent out over the system described above to be handled by a third party service provider. Total valuation results are received over the same communication network in the in box for the user and may be reviewed 274 by the user after accessing the in box and merging the data in the claimed datafile. The presently preferred method saves a user time by automatically transferring all files, whether from the out box or to the in box, when the user connects to the communications server via modem.

Detailed Description Text (48):
Referring again to FIG. 8B, a user selecting the out box from the perspective panel that shows the overview of workflow has several communication options with the system. As shown in FIG. 8K, in the out box the user may directly connect 276 to a communications server, such as EZNET, via modem. Although typically an out box transaction is sent 278 out from the out box, the connection to the communication server is bi-directional to save time so that new transactions are automatically brought into the in box 280 as discussed above. Items in the out box may alternatively be simply reviewed 282, moved 284 back into the in process box if determined that they need to be modified, or moved 286 into storage for future reference by the user who may be a repair facility that keeps long term records on work done.

Detailed Description Text (49):
Multiple storage options are available to a user as is shown in FIG. 8L. Selection 168 of the storage icon on the perspective panel 84 allows a user to review any and all related transactions in files stored in attached storage memory devices such as an internal hard drive or other type memory device. A list of workfiles that are sent to an insurance company library after completion may be viewed 288, a list of messages that has been sent to storage may be reviewed 290, and a communications log for all communications that have taken place between the remote computer and other computers may be viewed 292. Typically several types of communication logs are kept at the user's computer and the user may review items in a received logs 294, view an exceptions log 296, or review 298 the support log.

Detailed Description Text (50):
As described above in FIGS. 8E, 8G and 8I, the method of the present invention may include the steps of comparing repair costs using original equipment manufacture (OEM) parts from the car manufacturer, repair costs using after-market parts from some other supplier, and recycled parts costs. When considering recycled, or salvage, parts, the location of these parts may vary; therefore it is preferable for the computer data base provider to communicate with repair shops and salvage junk yards that can provide a salvaged part list at a particular price and location. This salvage information can then be updated and provided to users on a regular basis.

Detailed Description Text (51):
A more detailed example of a comparison of original manufacture parts after market parts and recycle parts is illustrated in FIGS. 9 through 12. In FIG. 9, when the estimate tab is selected in the user interface, an estimate display 300 is shown to a user on a computer screen. The screen has the individual parts that have been selected by the user for replacement or repair and also the parts and their part names and

values. The selection by user of an OEM part from the parts database display 302 shown on the screen will, in conjunction with selecting a comparison button, bring up any available equivalent recycled parts.

Detailed Description Text (52):
The recycled parts are shown on another screen which is presented to the user and the user may highlight a desired part and labor times for use in the estimate calculation being prepared. FIG. 10 illustrates the recycled parts selection screen 304. The recycled part screen 304 will only show parts that are available for the vehicle, and thus may not have all the parts necessary for a repair. In the recycled part screen 304, the user is presented with part, labor and assembly information accessed from the recycled part database preferably stored in a hard disk drive attached to the user's computer.

Detailed Description Text (53):
FIG. 11 shows the estimate screen after a recycled part has been selected and a user decides to add the recycled parts to the estimate by selecting the "add to estimate" button on the user interface (FIG. 10). In the example shown, new estimate lines 306 for the selected recycled door are added to the estimate. The added lines 306 include the cost of labor and individual parts necessary to incorporate the recycled part in the repair.

Detailed Description Text (54):
As seen in FIG. 12, once the user has selected the replacement parts necessary from the original equipment manufacturer list database the user may select a comparison of all three possible replacement parts whether OEM recycled or AM parts. Repair cost, to repair the parts that were damaged in the accident, are also appended to the estimate comparison. In this way, a user can see instantly the comparison of different methods and parts to determine the best course of action to take in settling a claim.

Detailed Description Text (55):
As additional explanation of the event log steps discussed in FIG. 8H that may be performed according to a preferred embodiment, FIGS. 13-15 provide an illustration of the steps a user may take through the graphic user interface. The event log records events/actions taken with respect to each insurance datafile. The event log, which is attached to the datafile, preferably automatically puts a time and date stamp on certain predetermined tasks or activities. There also may be manually entered event information added to the log. As is indicated in FIG. 13, the event log may be selected for viewing through the user interface. By clicking onto the event log tab in an opened workfile, an event screen 350 is shown listing the date, time, type of action and author of each event. A specific event may be selected to view, or to enter, additional textual information concerning the selected event.

Detailed Description Text (56):
To manually enter an event, a user may select from an event description menu 352 and either click on the relevant description or type in the code for the description as is shown in FIG. 14. FIG. 15 shows a setup menu with the table 354 of predetermined events that are available for selection in the events tab. The event log is useful both for appraisers/adjusters and insurance company managers to monitor claim processing efficiency. In one embodiment, only certain users may alter or add to the event log based on login identification, passwords or other security means.

Detailed Description Text (58):
The user has the option to view, using user input, a generic parts illustration for the selected part. The remote computer retrieves a parts illustration associated with the part from a memory device, and loads the parts illustration graphics image into a memory buffer. The user may then zoom in on the illustration to get a closer look at the part of interest. In a preferred embodiment, the textual description of the parts may be seen at the same time as the parts illustrations.

Detailed Description Text (59):
Referring to FIGS. 8F and 8G, once a user has selected the part or parts that are damaged, the user has the option to select using user input, whether to replace or repair the part. If the user chooses to replace the part, cost means estimates a replacement cost with OEM parts, a replacement cost with A/M parts, and a replacement cost with salvage parts. The method compares the replacement costs to determine a lowest replacement cost. The replacement cost broadly includes a part cost to replace a part, labor hours to install the part, and paint hours to paint the part, if required. If the user chooses to repair the part, the user enters user repair hours, and paint

hour values. The repair sum may or may not include costs for edging and other finishing work. After selecting all the necessary repairs and replacement parts; including labor costs and labor overlap savings, the computer calculates the total cost to repair or replace the damaged parts.

Detailed Description Text (60):
FIG. 16 illustrates one claim processing scenario that may be addressed with the presently preferred system and method with a damaged car driveable to a body shop employing a direct repair program (DRP). After damage to or loss of the car, the insured calls 401 the insurance company, and the insurance company suggests 402 a DRP body shop and informs the insured of car rental options. The insured drives 403 the car to the DRP body shop. The home office sends a claim assignment to the mailbox of the DRP in the Communications server. The body shop accesses the assigned claim and sets up a work file as described above. Using the method described above, the body shop prepares a computerized estimate. The body shop also takes electronic images of the car and keeps the estimate and images on local storage, for example a disk drive, or sends the estimate and images to a library for storing. The body shop then creates 404 a computer Estimate-Of-Record (EOR) and e-mails via the out box, as part of a work file, the EOR and electronic images to the insurance company. The insurance company receives 405 the e-mail of the EOR and the electronic images, prepares a work order, and e-mails, as part of a work file, an authorization number or work order number to the body shop. The body shop reviews 406 the estimate with the insured and receives repair authorization. The insured signs 407 the work order and schedules repair work with the body shop.

Detailed Description Text (61):
The body shop searches 408 for Like Kind and Quality (LKQ) parts, using the procedure shown in FIG. 18 and/or searches 408 for new or aftermarket (A/M) parts, using the procedure shown in FIG. 19. The term LKQ is used herein to refer to recycled/salvaged parts. The body shop repairs 408 the damaged car using the procedure shown in FIG. 20.

Detailed Description Text (62):
Referring to FIG. 17, the car may alternatively be brought to a non-DRP body shop, with the insured contacting 401 the insurance company and the insurance company suggesting 409 a drive-in estimate location at a body shop or at the location of an appraiser or adjuster. The insured brings 410 the car to the body shop and requests an estimate. The body shop performs 411 a computerized estimate using estimating software employing the methods described herein. The body shop also takes 411 electronic images of the car, and keeps the estimate and images on local storage, for example a disk drive, or sends, as part of the work file, the estimate and images to a library for storing, and informs the insured of car rental options.

Detailed Description Text (63):
The insured determines where and when to get the car repaired, schedules a repair date, and signs a repair order. The body shop receives 412 repair authorization; confirms insurance coverage; and schedules repair work or receives the car for repairs. The body shop sends 413 the estimate to the appraiser/adjuster. The appraiser/adjuster reviews 413 the estimate, and the body shop repairs 414 the car.

Detailed Description Text (64):
Alternatively, the insured can bring 410 the car directly to an appraiser/adjuster. The appraiser/adjuster performs 415 a computerized estimate, takes electronic images, and informs the insured of car rental options. The appraiser/adjuster gives 416 the insured a check for the estimated repairs. The appraiser/adjuster sends 417 the estimate to the body shop and the body shop reviews the estimate.

Detailed Description Text (65):
If the body shop determined 418 that the repairs exceed the appraiser/adjuster's estimate, then the body shop performs 419 its own computerized estimate, takes electronic images, of the car, and contacts the appraiser/adjuster. The body shop performs 420 an Estimate Requires Supplements procedure as shown in FIG. 22. Alternatively, if the body shop determines 418 that the repairs do not exceed the appraiser/adjuster's estimate, the body shop 414 searches for parts and repairs the car.

Detailed Description Text (66):
After the Estimate Requires Supplements procedure is performed, the body shop continues with the repairs. The body shop searches 414 for Like Kind and Quality (LKQ) parts, using the procedure shown in FIG. 23, and/or searches 414 for new or aftermarket (A/M)

parts, using the procedure shown in FIG. 24, and repairs 414 the damaged car, using the procedure shown in FIG. 22.

Detailed Description Text (68):
The body shop prepares 433 an estimate using estimating computer software, employing the methods described above. The body shop also takes electronic images of the car; keeps the estimate and images on local storage, for example a disk drive, or sends the estimate and images to a library for storing estimates and images; and reviews the estimate with the insured. If the car were deemed a total loss 434, then the body shop performs 439 a total loss calculation, using the procedure as shown in FIG. 21. The insured authorizes 440 that the car be torn-down.

Detailed Description Text (70):
The insurance company receives 437 the e-mail of the EOR and the electronic images, prepares a work order, and sends an authorization number or work order number to the body shop. In addition, an auditor may receive the EOR and electronic images and may audit the electronic images and estimate.

Detailed Description Text (71):
The body shop searches 438 for Like Kind and Quality (LKQ) parts, using the procedure shown in FIG. 23, and/or searches 438 for new or aftermarket (A/M) parts, using the procedure shown in FIG. 24. The body shop receives the necessary parts, confirms scheduled repairs, and repairs 438 the damaged car, using the procedure shown in FIG. 20.

Detailed Description Text (73):
Either the body shop tows 452 the car or receives the towed car; the body shop takes 452 electronic images of the car; and the body shop may provide car rental information to the insured. The body shop performs 452 a preliminary computerized estimate 20 using computer estimate software employing the methods described herein. The body shop e-mails the estimate and electronic images to the appraiser/adjuster. The appraiser/adjuster subsequently receives 454 the electronic images for review and if necessary, requests more images.

Detailed Description Text (74):
The body shop obtains 455 authorization from the insured or from the owner to either repair the car or tear down the car, and the body shop confirms 455 insurance coverage. The body shop takes more electronic images, performs a computer EOR estimate, and e-mails the EOR and electronic images to the appraiser/adjuster. The appraiser/adjuster reviews 456 the computer EOR and electronic images, and reaches an agreement with the body shop. If the car were deemed a Total Loss 457, then the appraiser/adjuster performs 462 a Total Loss scenario, using a Total Loss procedure as shown in FIG. 21. If the car is not deemed a total loss 457, then the repair shop proceeds through steps 458 through 461 as shown in FIG. 17 and explained below.

Detailed Description Text (75):
The body shop keeps the estimate and electronic images on local storage, for example a disk drive, or sends the estimate and images to a library for storing; and reviews 458 the estimate with the insured. After the insured authorizes 459 payment for repairs, the insurance company sends 460 an authorization number or a work order number to the body shop, and the body shop searches 461 for Like Kind and Quality (LKQ) parts, using the procedure shown in FIG. 24, and/or searches 461 for new or after-market (A/M) parts, using the procedure shown in FIG. 25. The body shop then receives all of the necessary parts, confirms scheduled repairs, and repairs 461 the damaged car, using the procedure shown in FIG. 20.

Detailed Description Text (78):
As illustrated in FIG. 21, if the damaged car were deemed 470 a Total Loss, a Total Loss scenario is performed. If the body shop is a non-DRP shop 471, an appraiser/adjuster determines 473 if the car is a Total Loss, and the appraiser/adjuster e-mails 473 an estimate and electronic images to the insurance company. However, if the body shop were a DRP shop 471, then the body shop determines 472 if the car is a Total Loss, and the body shop e-mails 472 the estimate, images, and any acquired charges to the insurance company, with acquired charges including tow charges, tear-down charges, and storage charges.

Detailed Description Text (81):
An Estimate Requires Supplements scenario is shown in FIG. 22. A body shop finds 480 additional damage, takes 481 electronic images, and prepares 481 computerized

supplemental estimate using the method described in FIGS. 8A-8L.

Detailed Description Text (82):
The body shop e-mails 481 the images and supplemental estimate to an appraiser/adjuster, and the appraiser/adjuster receives and reviews 482 the images. The appraiser/adjuster reaches an agreement with the body shop on the additional repairs, and the appraiser/adjuster prepares 482 a work order. The insured signs 483 the work order authorizing repairs, and the insurance company e-mails 484 an authorization number or work order number to the body shop. Upon receipt of repair authorization, the body shop continues 485 with the repairs and the search for parts for the car.

Detailed Description Text (91):
From the foregoing, a comprehensive system and method for managing insurance claim processing has been described. The system includes at least one remote computer, a mainframe computer (or server), and a network connecting the computers wherein an insurance claim datafile containing information pertinent to a particular claim may be transferred, accessed and processed by authorized parties. A common graphic user interface allows users to manage claims workflow, including the performance of estimate calculations, preparation of settlement material and preparation of internal and external correspondence. Additionally, a method of processing an insurance claim has been described that permits a user or users to create an insurance workfile and transfer all or part of the workfile over a network between computers at various locations where additional administrative or calculation steps may be performed and appended to the workfile.

CLAIMS:

1. A method of managing insurance claim processing comprising the steps of:

providing a remote computer in communication with a wide area network, said wide area network in communication with a computer in an insurance company home office;

sending an insurance claim work assignment from the insurance company home office computer to a communication server in the wide area network;

storing the insurance claim work assignment in an electronic mailbox in the communication server;

obtaining the insurance claim work assignment at the remote computer from the communication server;

generating an insurance claim datafile on the remote computer, said datafile corresponding to said insurance claim work assignment and configured to receive all data pertinent for processing an insurance claim;

allowing for bidirectional transmission of the datafile over the wide area network; and

building sections of the datafile at the remote computer using information accessed from an external source to the remote computer.

3. The method of claim 1 further comprising the step of converting the entire datafile into a formatted datafile to allow transmission over said network.

4. The method of claim 1 wherein said insurance claim datafile comprises a vehicle insurance datafile and the step of generating an insurance claim datafile comprises the steps of:

Recording data in the datafile on an insured and an assigned insurance claims adjuster;

Recording data related to an insured vehicle in the datafile; and

Recording vehicle parts data relating to OEM, aftermarket, and salvage parts for repair of the insured vehicle.

5. The method of claim 1 wherein the step of building the insurance datafile comprises transmitting a predetermined amount of data related to calculating a vehicle total loss valuation to the server, receiving the total loss valuation at the remote computer, and

appending the total loss valuation to the datafile.

6. The method of claim 1 wherein the step of building the insurance datafile comprises collecting a predetermined amount of data related to a vehicle, accessing a database containing vehicle valuation information, retrieving the vehicle valuation at the remote computer, and appending the valuation to the datafile.

7. The method of claim 1 further comprising the steps of:

generating an event log, said event log including information on actions taken on the claim; and

appending the event log to the datafile whereby a user may review the event log.

8. The method of claim 7 wherein the step of generating an event log comprises automatically generating event log entries.

9. The method of claim 7 wherein the step of generating an event log comprises manually selecting an event log entry.

11. The method of claim 10 wherein the step of formatting the datafile comprises formatting the datafile into network TCP/IP format, whereby the remote computer may readily communicate with, and transfer the entire datafile to, the computer in the home office.

12. The method of claim 11 further comprising the steps of a user selecting a portion of the insurance datafile from a predetermined list of portions that may be individually sent to a third party, and transmitting the selected portion of the insurance datafile to the third party.

13. A method of managing insurance claims processing comprising the steps of:

providing a remote computer in communication with a wide area network, said wide area network in communication with a computer in a home office;

generating an insurance claim datafile on the remote computer, said datafile containing data on an insured, data on a claim, data on satisfying a claim, wherein said datafile is configured to receive all data pertinent to the claim;

modifying the datafile at the remote computer to update the datafile with information accessed from an external source to the remote computer wherein the datafile contains an estimated total loss valuation and information for calculating a repair estimate; and

determining if a vehicle is approaching a total loss by automatically monitoring repair estimate calculations and the estimated total loss valuation.

26. The system of claim 22 wherein the insurance datafile further comprises a repair estimate having OEM, aftermarket and recycled parts costs.

29. A system for processing insurance claims comprising:

a remote computer for entering data related to an insured;

a wide area network capable of communicating with said remote computer;

a computer in communication with said wide area network;

an insurance claim datafile, generated at said remote computer, wherein the entire datafile is transferable between the remote computer and the computer, said datafile having inspection, repair estimate, total loss, and settlement information related to an automobile insurance claim; and

a user interface for managing insurance claim datafile processing pertaining to an insurance claim, said user interface allowing communication of input and output data, said user interface further comprising means for calculating and comparing repair and total loss values.

30. The system of claim 29 wherein the interface further comprises:

a display for viewing a universal entry screen;

means for entering data onto the display;

interface logic, coupled to the display for processing data entered on said data entering means and communicating said data to the universal entry screen on said display.

31. The system of claim 30 wherein the universal entry screen displays a datafile having a plurality of tabbed sections, each of said tabbed sections accessible by a user through said data entering means.

32. The system of claim 31 wherein the plurality of tabbed sections comprise:

an administrative data tab for insurance company claim administration information;

a vehicle information tab for information pertaining to an insured vehicle;

an estimate tab for gathering and computing information on vehicle repair costs;

a salvage tab for gathering and computing information on potential vehicle salvage values; and

a settlement tab for storing and updating claim settlement information.

33. The system of claim 32 wherein the tabbed sections further comprise:

a totals tab for viewing and manipulating estimate totals;

a total loss tab for viewing and manipulating a total loss calculation;

a notes tab containing user remarks regarding a claim;

a correspondence tab containing letters related to an insured;

a rates tab for containing labor, tax, and discount rates; and

an event log tab for maintaining a list of actions taken on the datafile.

35. The graphic user interface of claim 34 further comprising a datafile window for displaying an opened insurance claim datafile, said opened datafile in said datafile window having a plurality of overlapping sections, each section having a visible identification tab.

36. The graphic user interface of claim 34 further comprising a button bar having a plurality of user choices, said button bar including at least one context sensitive button representative of a relevant user choice for information currently being viewed in the datafile window.

37. A system for processing an insurance claim for a vehicle, the system comprising:

a first computer for generating an insurance claim assignment;

a communication server capable of communicating with the first computer over a communication network;

a second computer in communication with the communication server;

a plurality of insurance claim datafiles generated at the second computer, each insurance claim datafile transferable over the communication network, and a plurality of insurance claim assignments, each of the plurality of insurance claim datafiles associated with a respective one of the insurance claim assignments; and

a graphic user interface at the second computer, the graphic user interface comprising an estimate comparison screen for displaying information on a selected one of the plurality of insurance claim datafiles, the estimate comparison screen simultaneously displaying replacement cost data for original equipment manufacturer (OEM) parts, recycled parts, and after market parts, and displaying a part repair cost.

Good



# ©Pegasystems to Deliver PegaSURE to AIG for Customer Relationship Management

*PR Newswire*; New York; Oct 6, 1998;

**Start Page:** 1
**Dateline:** Massachusetts

**Abstract:**
*CAMBRIDGE, Mass., Oct. 6 /PRNewswire/ -- ©Pegasystems Inc. (Nasdaq: PEGA), a leading provider of Customer Relationship Management (CRM) solutions, announced today an agreement to deliver its PegaSURE(TM) solution to American Home Assurance Company, a subsidiary of ©American International Group, Inc. (NYSE: AIG), a leading U.S.-based international insurance organization.*

*In today's rapidly changing **insurance** environment, ©Pegasystems provides solutions that help **insurance** companies to grow their business, reduce costs, and increase customer satisfaction. The PegaSURE solution enables **insurance** companies to make their **processes** more efficient and proactive, empowering their representatives to delight customers with best-in-class service. The PegaSURE solution gathers customer-related information about accounts, relationships, **claims** data, and agent details from separate back-end systems. It then presents relevant information on a single screen that allows easy navigation to initiate and complete multiple workflows. Finally, the system tracks the **process** until payment is completed or the account is closed, then updates all local **databases**.*

## Full Text:



Industry: COMPUTER/ELECTRONICS; INTERNET MULTIMEDIA ONLINE; INSURANCE

CAMBRIDGE, Mass., Oct. 6 /PRNewswire/ -- ©Pegasystems Inc. (Nasdaq: PEGA), a leading provider of Customer Relationship Management (CRM) solutions, announced today an agreement to deliver its PegaSURE(TM) solution to American Home Assurance Company, a subsidiary of ©American International Group, Inc. (NYSE: AIG), a leading U.S.-based international insurance organization.

Initially, American Home will use the solution to manage and automate processes associated with policy renewals and new business submissions for its Small Business and Workers' Compensation Division. American Home chose PegaSURE to more efficiently manage these processes, and to drive improvements in the quality of service delivered to its policyholders.

In today's rapidly changing **insurance** environment, ©Pegasystems provides solutions that help **insurance** companies to grow their business, reduce costs, and increase customer satisfaction. The PegaSURE solution enables **insurance** companies to make their **processes** more efficient and proactive, empowering their representatives to delight customers with best-in-class service. The PegaSURE solution gathers customer-related information about accounts, relationships, **claims** data, and agent details from separate back-end systems. It then presents relevant information on a single screen that allows easy navigation to initiate and complete multiple workflows. Finally, the system tracks the **process** until payment is completed or the account is closed, then updates all local **databases**.

At American Home, PegaSURE will automatically identify policies about to expire, gather necessary information, route to underwriters for quote generation, and then create correspondence. On the desktop, representatives will use PegaREACH Professional, an easy-to-use graphical user interface that includes dynamic scripting for personalized interactions.

"We are delighted to add American Home to our growing list of blue-chip insurance clients," stated David Valovcin, @Pegasystems' Vice President, Strategic Business Development. "Our leading clients know that in service industries, the quality of the interaction with the customer is a key differentiator. They know that consistently high-quality interactions yield customer loyalty and retention, the ultimate drivers of profitability. By providing the technology to achieve this, @Pegasystems is delivering a powerful solution to the insurance industry."

@Pegasystems' current insurance clients are a showcase for the breadth of the PegaSURE CRM solution, with functionality that includes the ability to cross-sell products across multiple lines of business, support for inbound and outbound telesales, automated claims processing and underwriting, and integrated customer service through the call center and the Internet.

About AIG

AIG is the leading U.S.-based international insurance organization, and is among the largest underwriters of commercial and industrial insurance in the United States. Its member companies write property, casualty, marine, life, and financial services insurance in approximately 130 countries and jurisdictions, and are engaged in a range of financial services businesses.

About @Pegasystems

@Pegasystems is a leading provider of Customer Relationship Management solutions. These solutions allow large businesses to better manage complex customer interactions and to automate the business processes within their sales and service delivery operations. Many of the world's largest institutions use @Pegasystems' solutions to manage mission-critical customer service activities. The @Pegasystems solutions support multiple channels of customer contact, helping organizations improve staff productivity, operational efficiency, and customer satisfaction. @Pegasystems' solutions are Internet-enabled, Year 2000-ready, and operate in multi-tiered, client/server environments.

@Pegasystems' headquarters is located in Cambridge, Massachusetts. The company has regional offices in North America, Europe, and Australia. Access @Pegasystems on the World Wide Web at www.pegasystems.com.

Forward-Looking Statements

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# Pharmaceutical care in the community pharmacy

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**Abstract:**
*There are 3 major levels of care being given in the community pharmacy today. We do not count ground level, which is pure dispensing without even complying with the Omnibus Budget Reconciliation Act of 1990. Level 1 is compliance with the mandates of OBRA 1990, which should be the minimum standard of care for all patients. It is the foundation upon which Level 2 is built. Level 2 would involve added services such as blood pressure monitoring, metered dose inhaler instruction, blood glucose monitor training, adherence monitoring and follow-up, and a general increased effort and interest in patient outcomes. Level 3 practitioners may carry out disease state management programs, patient education programs, therapeutic monitoring, self-care consults, and other efforts designed to maintain or improve quality of life for the enrollee.*

## Full Text:



s a student at Ole Miss in the 1960s, I began to feel a real sense of pride in my role as a future pharmacist. I could envision my career in pharmacy as an opportunity to play an integral part in the delivery of health care and attain a measure of respect similar to what I saw in my father and grandfather, both of whom were physicians. Since my graduation in 1967, I have been seeking ways to optimize the use of the tools I have as a pharmacist.

Within a year after graduation, it became clear to me that I could do a lot more with my education if only there were some mechanisms for utilizing my talents in the system. The new paradigm of pharmacy practice has given me the opportunity to define new professional roles, and this article will present the steps involved in the evolution of my practice.

At about the same time that people realized dispensing could be done very well without a pharmacist, they discovered the major impact we as pharmacists can have on health outcomes. Community pharmacists are in a perfect position to manage their clients' medication as well as educate them in the area of self-care and wellness.

The movement toward pharmaceutical care has been hastened by recent reports suggesting new standards of practice and treatment guidelines. The Diabetes Control and Complications Trial (DCCT) results show that the major complications of diabetes can be reduced or avoided by tight control. The Postmenopausal Estrogen Progestin Intervention (PEPI) study gave us new information on the benefits of hormone replacement therapy in the prevention of osteoporosis and reduction in cardiovascularrelated problems. The fifth Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure study (JNC-V) made us more aware of the importance of controlling blood pressure within normal limits. Global Initiative for Asthma: Global Strategy for Asthma Management & Prevention (©National Institutes of Health) presents definite protocols for the treatment of asthma.

The fact that large numbers of patients are not yet aware of the new information or have not applied the results to their own situations makes it imperative that pharmacists get involved in identifying patients and disseminating information.

The term pharmaceutical care has surfaced during the evolution of pharmacy in an effort to describe a standard of care that differs from the traditional. The term disease state management connotes the use of the pharmacist's expertise in guiding a patient through the care of a disease. It seems, however, that neither of these terms adequately describes the activities of a pharmacist involved in providing educational programs or therapeutic consults on an appointment basis for people who are not suffering from a disease. The use of the pharmacist's expertise in preventative care does not always fit well under the umbrella of pharmaceutical care or disease state management.

Levels of care

There are three major levels of care being given in the community pharmacy today. We do not count "ground level," which is pure dispensing without even complying with the Omnibus Budget Reconciliation Act of 1990. Level 1 (L-1) is compliance with the mandates of OBRA '90, which should be the minimum standard of care for all patients. It is the foundation upon which Level 2 (L-2) is built.

Level 2 would involve added services such as blood pressure monitoring, metered dose inhaler instruction, blood glucose monitor training, adherence monitoring and followup, and a general increased effort and interest in patient outcomes.

Level 3 (L-3) practitioners may carry out disease state management programs, patient education programs, therapeutic monitoring, self-care consults, and other efforts designed to maintain or improve quality of life for the enrollee. L-3 practitioners are focused on education, motivation, monitoring, and referral and may or may not be dispensing medication to their clients. They are outcome oriented.


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A pharmaceutical care practice as described in this article would be considered a high L-2 or L-3 practice. The terms pharmaceutical care program and disease state management program may be used to describe the same types of efforts. It should be noted that L-3 practitioners can carry out disease state management programs and provide pharmaceutical care in the defined sense. In addition, they can put forth formal efforts to educate people who may have an interest in a particular area in which the pharmacist or staff member has additional expertise.

The facility

The facility in which one practices can be a definite barrier to any level of practice over ground level. The pharmacist must be able to speak with the client/patient with a minimum of visual and auditory distractions. In addition, every community pharmacy needs to have the pharmacist fairly close to the dispensing area to check prescriptions and access computer data.

This can be accomplished in several ways. For example, in my practice, we have created two areas for L-1 and L-2 functions. These areas are H-shaped and have the following dimensions: The vertical side panels are 60 in. high and 36 in. deep; the horizontal panel is 48 in. wide and 22 in. deep. Under the horizontal panel is a support with an opening for the knees. The depth of the horizontal panel is important, because the pharmacist should be able to take blood pressure readings in this area (a wall-mounted blood pressure monitor can be placed on the vertical

panel). If it is much deeper than 22 in., it could be difficult to reach a patient's arm comfortably. The placement of the horizontal panel flush with the pharmacist's side of the booth will allow the patient to enter into a semiprivate area. Chairs with arms and rollers are placed on either side (we used plywood covered with laminate that matches the color scheme of the pharmacy). Watch out for sharp corners, and provide for knee room, so that the patient is within a comfortable reach.

With a little imagination and a cabinet builder, the pharmacist can be in business. (Another option would be to contact an organization such as CareStream, which has custom-designed counseling booths as part of its program-see Table 1.)

L-3 activities will almost always require a private area. We have a 12-ft. x 14-ft. room containing a small conference table, shelves for literature, videos and demonstration devices, and a video player. A window allows us to look out into the pharmacy. The room should preferably have a door that will close in case there is noise outside or in the event one is talking about a sensitive topic. A private area can also be constructed using office panels or glass partitions. Privacy areas can be created or enhanced by the use of plants and other decorative featu res.

State or national pharmacy organizations and drug wholesalers may have information on a practice site that could be used as an example. We visited several facilities before completing ours and found that pharmacists were more than willing to let us take pictures and gather information. Some fixture manufacturers have examples of pharmacy layout and design that could possibly be adapted to your own particular pharmacy.

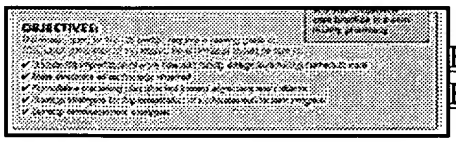
Computer equipment and software

What extra equipment is needed to provide L-3 services? One very important aspect of any pharmaceutical care practice is proper use of communication techniques between pharmacist, patient, and physician. The pharmacist, at a minimum, must be able to generate progress notes, followup letters, or other written communications to physicians and patients. A separate computer not used in the dispensing process may be utilized for communication purposes. A word processing program such as Word for Windows or WordPerfect makes letter writing much easier. We use Windows-based software to produce letters to physicians, patients, and payers. Additionally, we have the ability to print our own letterhead, newsletters, business cards, brochures, and other marketing materials. We also personalize the patient handouts used in our teaching programs.

The computer should have a large hard drive and plenty of RAM to handle the newer programs that are appearing. A fax/modem gives us the ability to fax a document directly from the computer screen to the physician. We are also able to access the Internet as well as medical on-line services. We use the Windows Power Point software to produce slides and hand-outs used in group presentations.

Ask a trusted computer vendor for advice about the best system for your needs. If you plan on investing in pharmaceutical care or disease state management software, you should ask about system requirements prior to the purchase of a new computer. Many vendors will include free preloaded software, like the Windows software mentioned above, with a purchase of hardware.

An inkjet printer or a laser printer is essential to produce professional-looking documents, including graphics. In my own practice, we use a Hewlett Packard Deskjet. A satisfactory printer can be acquired for $300 to $600, depending on the make and model. We have not yet found the need for a color printer, but we sometimes wish our printer were faster.

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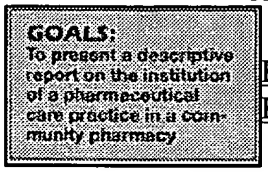


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GOALS:

While you are shopping, you might want to get a CDROM feature added to your system. Want to respond to a physician's request for information on a treatment for diabetes? If you have purchased the latest American Diabetes Association (ADA) publication, the Clinical Education Series 1995 on CD-ROM, you can plug the CD in, pull up the pages you want, and print them out. CDROM technology puts a vast amount of information at our fingertips.

Pharmaceutical care or patient management software programs are now available from several companies. The simpler ones are used strictly for documentation of interventions, and some of the dispensing systems now have this capability. The more advanced patient management systems are usually on a separate computer and would generally be used for a select group of patients.

At least two companies are working toward interfacing the dispensing system with the patient management system to avoid entering prescription data into both systems. There should be space for complete patient information, including diagnosis, insurance data, medications, and drug allergies. Most have areas for entering extensive notes and data, including documentation of interventions. Some have the ability to print "superbills," HCFA-1500 forms, and NARD Pharmacist Care Claim Forms.

At least three companies are developing or have developed disease management modules in specific areas. The ones we see most often are modules for asthma, hypertension, and diabetes. They are designed to make the provision of care for patients in these categories much easier by specific protocols. Our advice to the pharmacist is to look carefully at your specific needs and resources and to investigate each program before deciding on one.

Work flow: Finding the time to care

The busy pharmacist must have some extra time to carry out the more intensive L-2 and L-3 activities. This time can be found by arranging the work flow and by maximizing the use of technicians. While state laws vary, technicians in Mississippi are allowed to input data into the computer and to count, bottle, and label medications. The pharmacist must check all their work.

We use a series of color-coded baskets. When a person comes in with a prescription and presents it to the intake tech, she puts it into the appropriate basket (green for pickup later, red for waiting, tan for delivery, black for drive-through). It is then given to the dispensing technician for input and filling. The pharmacist intervenes in the case of an on-screen drug interaction or other DUR message. The filled prescription, stock bottle, counseling sheet, and written prescription (if a new one) are then passed to the pharmacist, who checks it and accesses the patient information on the computer.

He then counsels the patient and passes the order to the clerk for checkout. Our pharmacists are "recovering dispensers" who no longer count pills. Some of the companies offering pharmaceutical care packages can help you in restructuring your work flow and in training technicians (see Table 1 ).

Gaining knowledge in specific areas

The pharmacist who wishes to carry out L-3 care must have the proper knowledge base about the medical condition concerned. There are numerous educational opportunities being offered in the areas of asthma and diabetes. Most of the programs we have seen in our area will require three or more days to complete. In other words, we are talking about more than just a short continuing education course. I think it safe to say that most community pharmacists will need that much time to absorb all of the information that needs to be presented.


Table 1
**Pharmaceutical care companies (partial list)**
Carepoint: Patient management software, pharmacist training, 1-(800) 298-1824
CareStream: Patient management software, work flow, pharmacist and technician training, 1-(800) 314-5927
MedOutcomes: Patient management software, pharmacist training, (804) 330-3915

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Table 1 Pharmaceutical care companies (partial list)

The goal of such an educational experience should be to give the attendee knowledge of the most recent information about a condition, along with the confidence in his or her ability to interact with the patient and the physician. Programs that offer such in-depth information may also lead to "credentialing" or "certification" in a

particular disease state (see Table 2).

Credentialing and certification are still rather ambiguous terms, and the pharmacist should be aware of this when officially claiming expertise in an area. A state board of pharmacy or state pharmacy association should be able to answer related questions.

It is important to distinguish what type of activity the pharmacist will conduct in utilizing this added knowledge. As an example, in the case of an asthma patient, the physician diagnoses, prescribes, and sets treatment goals. The pharmacist then utilizes his or her knowledge of the use of spacer devices, peak flow meters, and accepted guidelines for treatment of asthma to help the patient attain the therapeutic goal. The educated pharmacist may even suggest therapy changes if the patient's treatment falls outside accepted guidelines or if the patient encounters obstacles in attaining stated goals.

Pharmacists willing to spend a longer time in study and preparation may work toward attaining the status of Certified Diabetes Educator. The CDE designation is available upon successful passing of the national examination, which is not restricted to pharmacists and is not to be confused with other types of credentialing or certification.

Hypertension, dyslipidemia, arthritis, gastroesophageal reflux disease, peptic ulcer disease, and several other chronic diseases are being targeted as candidates for pharmaceutical care or disease state management programs, and efforts are under way to provide educational experiences and credentialing in these areas.

Some pharmacists have not limited themselves to the highprofile diseases and have found their own niches through self-study. They have become authorities on subjects for which there are no formal educational offerings. Debra Goodman Singer, Kalamazoo, Mich., is an authority on hormonal therapies for women. The physician refers problem patients to her, whereupon she decides which therapy is indicated, makes suggestions to the physician, then monitors the effectiveness of the treatments. Many of her recommendations are for compounded formulations with dosages customized to the patient. Jennifer Montgomery-Salguero, from Servena Park, Md., is a pharmacist who does drug therapy consults in the traditional manner but is also an expert in alternative or complimentary medicine treatments. She accepts consult referrals from patients and health professionals and suggests appropriate products which the patient purchases elsewhere.

There are many other areas where one can become competent enough to provide pharmaceutical care programs. There are numerous publications addressing smoking cessation. We have used all of the information we could find over the last few years to put together our own smoking-cessation program.

New study results such as the Postmenopausal Estrogen/Progestin Intervention (PEPI) trial have triggered the production of new learning modules such as The Pharmacist's Guide to Managing Menopause, soon to be available from Wyeth-Ayerst. This book is a comprehensive guide designed to provide pharmacists with the information they need to counsel women during the premenopausal, perimenopausal, and postmenopausal years.

One important part of the pharmacist's armamentarium should be the ability to empower the patient. Knowledge of the medical condition and effective teaching skills are necessary, but they are useless if the patient is not motivated toward self-care. There are some materials available on this subject, such as The Physician Within, a book by Cathy Feste. The "transtheoretical model," which has been seen in various forms, is a behavioral model that can be a valuable tool in determining the approach to take in empowering the client. It assumes that treatment adherence is a behavior and that patients will fall into one of five stages in considering self-care: precontemplation, contemplation, preparation, action, or maintenance. The pharmacist identifies the stage the patient is in and takes the appropriate action based upon those suggested for each category (see Table 3). The reader is encouraged to pursue this subject further.

Beginning a program: Are you prepared?

When you are ready to perform an L-3 program, you will have a thorough knowledge of the subject. You will have at hand pertinent teaching materials such as books, pamphlets, flip charts, and checklists. There will be an area in the pharmacy designed for private consultation. You will be able to conduct an interview, gather pertinent data, identify problems, formulate a care plan, and communicate in writing with the physician. You will have either a paper chart or a computer system that allows entry of data on the patient and a system of documentation for each encounter. You will have mechanisms to follow up, monitor, and assess outcomes. And, finally, you will have addressed the area of billing and reimbursement.

Informing physicians

You must make physicians fully aware of what you are doing in order to prevent future problems. And, for optimal outcomes, physicians must also be a part of the team. Various methods to achieve this end may be used, but one that has proven successful is the focus group meeting with key physicians.

The pharmacist should arrange a meeting for a small number of doctors and explain the concept of pharmaceutical care. A presentation folder containing your menu of services and a brief description of each program can be easily prepared for them to take home. Your qualifications and your interest in the particular disease state or condition should be made evident. A key point to be emphasized is that this activity in no way infringes upon their practice boundaries and that they will not lose control of their patient. You should further stress that the educated and empowered patient is more likely to come back for scheduled appointments and less likely to report unexpectedly in an acute or emergency situation.

The issue of cost may not arise, but if it does, you should be able to justify your proposed charges. You should invite questions and be able to answer all of them in a satisfactory manner. A personal visit, letter, or phone call should be part of your follow-up within about a week and on a regular basis thereafter in an effort to solicit patients. Physicians forget quickly, so they must be visited or communicated with as often as is practical. Marketing experts will say that it takes several visits before you can expect any results. Don't give up.

Identifying and recruiting patients

The number of people with diabetes has been estimated at 5%-6% of the U.S. population. Estimates suggest that 30% of the adult population of the United States has hypertension. Twelve million Americans, or about 4% of the population, have asthma. Based on these percentages, you can easily estimate the number of patients in your shopping area with those conditions. You may also assume that a large percentage of those patients are not following accepted treatment guidelines for one reason or another. Those who fall outside the guidelines are potential subjects for your pharmaceutical care efforts.

Most pharmacy dispensing systems have the capability of printing reports that will identify patients who fall within the group you are going to recruit. Once this is done, patients or clients can be solicited by mail or in person when they come into the pharmacy. And if the focus group meeting was a success, you can anticipate getting direct referrals from the physicians.

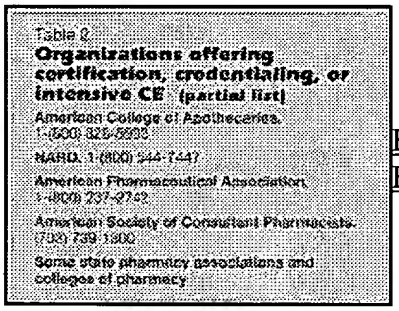
Table 2
**Organizations offering certification, credentialing, or intensive CE (partial list)**
American College of Apothecaries
1-(800) 325-5993
NARD: 1-(800) 544-7447
American Pharmaceutical Association
1-(800) 237-2742
American Society of Consultant Pharmacists
(703) 739-1300
Some state pharmacy associations and colleges of pharmacy

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Table 2 Organizations offering certification, credentialing, or intensive CE (partial list)

Media advertising is also an option. Your menu of services should be posted in a prominent spot in the pharmacy, and your entire staff should help disseminate information. Consult pharmacy journals for calendars of events that could relate to your areas of expertise; National Diabetes Month, for example, is an excellent time for you to increase promotional activities by speaking to local civic groups. Home blood glucose meter manufacturers could stage a "meter day" at which they demonstrate their product in your pharmacy. And they will often help fund media advertising prior to the event. Each patient who enters the pharmacy can be given a brochure explaining your programs. These events will attract not only your regular clients but others who have never been in your pharmacy.

Marketing could be directed toward employers in your area. Reduction in lost work time because of exacerbation of illness is another point to be made. Even if the only outcome is an increased sense of well-being or quality of life for the employee, your efforts can be considered partially successful. Happy people perform better in the workplace. Local mental health agencies might see a benefit in having their ambulatory patients more closely monitored for treatment adherence; your local hospital could find it cost-effective to pay you to manage uninsured patients who

overutilize the emergency room.

Early efforts at recruiting patients may be discouraging, especially when you feel sure you can help those who do not sign on. The transtheoretical model mentioned earlier might be tried with recalcitrant patients whom you think would really benefit from your program.

General rules for all programs

An initial interview should include: Patient demographic data such as name, address, phone number, and insurance information Physicians of record Medical history, with all diagnoses past and present, and family history of disease Medication history, including OTC, herbal, homeopathic, and other alternative/complimentary treatments Psychosocial barriers Financial barriers Other pertinent information that could impact the therapeutic goal Discussion of the cost of the program, if appropriate Obtaining of medical information release, if necessary Request for a Certificate of Medical Necessity from a physician, if appropriate Pharmacist duties include Assimilation and analysis of information gathered on interview Assessment of the problem or potential problem Communication with other health professionals, if necessary Development and implementation of a care plan Follow-up, monitoring, and modification of care at appropriate intervals Assessment of outcomes Reimbursement for services How will you charge for your services? In the case of the long-term management of a chronic disease, should you charge a fee for each session based on time spent, or should you charge a capitated fee for a specific length of time? There is no right or wrong way to do it. A year-long capitated fee might be an incentive for the patient to remain in the program, but it could also invite overutilization of your time by some clients. A fee-for-service arrangement might be better in some cases but could result in missed appointments and client dropout. Since future reimbursement may depend on outcome studies done on earlier programs, it is important to have the patient remain active within the contract period and complete the program as planned.

A number of patients will be willing to pay cash for your services, especially when they understand the benefits derived and the complications averted. Billing insurance companies for nondispensing pharmacy services is still in its infancy. Some pharmacists have begun to collect, but, for the most part, it remains difficult. Some pharmacists advocate charging the insurance company a percentage of the amount they saved as a result of their pharmaceutical care programs; others prefer to arrive at a charge in some other fashion.

In order to arrive at a charge for a particular program, one must analyze the cost to the business to present the program. The cost would include, but not be limited to, pharmacist's salary, other employee benefits, computer and office supply expenses, and clerical support. Pharmacist Gene Memoli, Darien, Conn., has done considerable work in the area of reimbursement and is being paid for about two thirds of his claims for pharmaceutical care services. His advice to pharmacists is to be persistent and to find the right person to talk to at the insurance company.

Most **claims** for these **programs** would be paid by the major medical portion, not by the pharmacy benefits portion of the **insurance** plan. Memoli has had the most success using the HCFA-1500 form, which seems to be accepted by a majority of **insurance** companies. The December 1995 issue of Pharmacy Reimbursement & Disease Management Report, a newsletter available through the American Pharmaceutical Association, listed a number of CPT billing **codes** applicable to pharmaceutical care services. St. Anthony Publishing (1-[800] 632-1023) has issued the Coding & Reimbursement Guide for Pharmacists, which may also be helpful. The new National Council for Prescription Drug **Programs** (NCPDP) professional pharmacy services **codes** are proposed for future use in the billing **process**, and the new NARD **claim** form utilizes these **codes**.

Some insurance companies will require a Certificate of Medical Necessity from the physician. The company representative should be able to tell you if one is needed and what form it should take. Some will also request a detailed list of services performed and the expected outcome, including any cost savings. Recent asthma studies have shown that emergency room visits are reduced when patients are educated in the proper management of their disease. The cost reduction in emergency room visits easily offsets the cost of asthma management programs. If proper blood glucose control can eliminate or reduce the complications of diabetes, then the educational effort will be cost-effective. These points should be stressed.

A good starting point

A good program to start out with is hypertension management. It is not so time-consuming and will be a good introduction to pharmaceutical care for both the pharmacist and the patient. It offers an opportunity to let patients and family members know that you have become interested in a higher level of care and that you are able to help guide them through the treatment plan designed by their physician. It is important to become proficient in taking

blood pressure readings and to do some studying about the care of patients with high blood pressure. This includes a knowledge of the pathophysiology of hypertension, the role of exercise, and treatment options both pharmacological and nonpharmacological.

You will need a reliable blood pressure monitor, preferably a mercury manometer similar to those used in physicians' offices. We use a well-mounted model with three different sizes of cuffs available: the large cuff for an arm measurement of over 33 cm and a regular-sized cuff for arms up to 33 cm. We also have a child's cuff for very small arms.

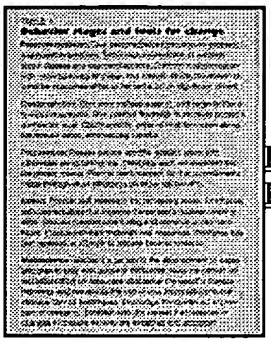

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TABLE 3 Behavior stages and tools for change

We use our patient management software to enter blood pressure readings according to date and time and are able to print out readings in graph form. There is at least one electronic blood pressure monitor being marketed that is capable of graphing readings over time; that could be an option if you feel the need for more technology. Before we began using the computer software, we used printed cards, similar to business cards, on which we wrote the readings each time a person came in. This works quite well and is inexpensive. Each enrollee is furnished with a packet of information, and we personalize much of the literature on our word processor.

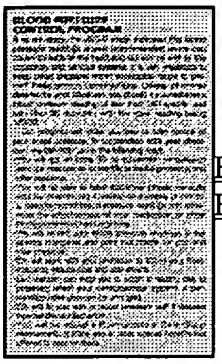
The purpose of our program is to educate the patient on the self-care of hypertension, with the goal of attaining normal blood pressure readings and maintaining or improving quality of life. An initial interview is done as mentioned above, under "General rules for all programs" (see page 86). We then arrange an appointment to discuss the pathophysiology of hypertension and answer any questions the patient or family members may have. We encourage weekly blood pressure checks in the pharmacy when a patient is beginning new medications or having dose changes. Some patients who are subject to "white coat hypertension" may need to be supplied with a home blood pressure monitor, but they should be encouraged to record their readings and bring them into the pharmacy monthly.

Information on treatment progress may be furnished to the physician as needed or when the patient returns for an office visit. Physicians and patients may find this a valuable service as patients begin new medications, because of the ability to give a limited supply of medication while monitoring effectiveness. When the patient is stabilized, a larger, more economical quantity is dispensed.

We offer the hypertension management program for a small monthly fee, and we require a minimum six-month enrollment. We charge what we feel our local market will allow, and that figure will naturally be variable in different practice areas. We recruit patients for this program by notifying them of its availability each time a prescription is filled for an antihypertensive agent. We use the information below, a copy of which is given to each prospective client.

A typical case

John Doe has heard that you have an interest in caring for diabetes patients. His doctor has told him that you know as much as anyone in town about diabetes and that he should go and talk to you.



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BLOOD PRESSURE CONTROL PROGRAM

It seems that this person had a fasting blood glucose reading of 300 mg/dl today at the physician's office. He tells you he has known about his diabetes for a while, but since he felt OK, he did not do anything about it. He seems interested now in doing what it takes to get his blood sugar under control. It is now 3:00 P.M. on Monday, the busiest day of the week. You tell him that you just returned from a diabetes seminar and that you feel you can help him but that it will take some time and effort. You tell him about your diabetes management program, explaining the cost/benefit ratio and goals of the program. He seems anxious to learn more, and you agree to call him at home that night for an initial interview. He picks up a pamphlet on the Diabetes Control & Complications Trial and leaves.

During the later interview, you find that he has no formal diabetes education. He does not abide by any diet and does not use a home blood glucose monitor (HBGM). He had previously taken an oral hypoglycemic but stopped it a couple of years ago. He appears to be in the contemplation stage of self-care, so you will keep that in mind when formulating a behavior modification plan. Since each session can last up to an hour, an appointment is made for him to come in on Saturday afternoon, when you have some extra help.

At this first appointment, you present an overview of diabetes, and you tell him in detail about the complications of poorly controlled diabetes, including retinopathy, neuropathy, and nephropathy. You now have his attention, and you answer any questions he may have. You give him several pieces of literature, including a diabetes study book donated by a drug manufacturer. Since Type II diabetes often is associated with elevated lipid levels and hypertension, you check his blood pressure and refer him to his physician for a lipid profile. You also find that he has never had a glycosylated hemoglobin test run; those results can be used as a baseline to assess the outcome of the educational efforts. You refer him for a hemoglobin Ac test. He also needs an HBGM, so you demonstrate several different models. He chooses one having computer interface capabilities, thus allowing you to print reports to share with his physician. He is instructed on the use of the monitor and told to monitor before meals and at bedtime until he comes in for his next visit. Remind him that it is important that he bring his monitor in with him for each visit.

Earlier, his physician had said that a target blood glucose of between 80-140 mg/dl before meals was acceptable, so that will be his goal. You find that he has recently had a comprehensive ophthalmologic exam, which showed no problems. After about an hour, he begins to get a little tired and less attentive, so you ask if he has any more questions about today's session. As he leaves, another appointment is set up for the following week.

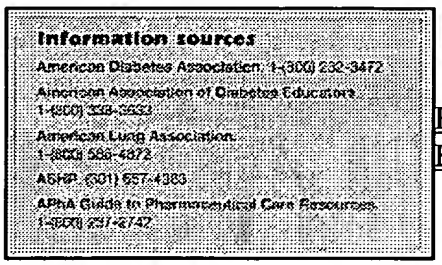
His next visit a week later indicates a hemoglobin Ac of nine (the goal is seven) and elevated cholesterol levels (the goal is to normalize lipid levels). His physician expresses his appreciation of your referral for lab work. Over the course of time, you will continue to work through the educational program and answer any questions he may have as he moves slowly toward his established treatment goals. You will attempt to analyze problems that occur and will communicate with his physician when necessary or at agreed-upon time intervals. Outcomes The goals of this management program would be to achieve near normal blood glucose levels, to normalize lipid levels and blood pressure, and to minimize episodes of hyperglycemia and hypoglycemia. The result of reaching these goals should be to reduce or eliminate the long- and short-term complications of diabetes. The patient would also be expected to have a better quality of life and an increased sense of well-being because of his successes in self-care. Reaching treatment goals would also imply positive economic outcomes.

Conclusion

Traditionally, the activities of the pharmacist have been directly connected to the dispensing of medications. That is no longer the case as we assume new roles to satisfy unmet needs. It is absolutely critical that we accept the new

responsibilities and immediately make them a permanent part of the practice of pharmacy. The Eagles said it well in this verse from their song "The Last Resort":

Who will provide the grand design for what is yours and what is mine, there is no more new frontier, we have got to make it here. References are available upon request

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Information sources

**[Author note]**

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# Using Kohonen's self-organizing feature map to uncover automobile bodily injury claims fraud

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**Abstract:**
*Claims fraud is an increasingly vexing problem confronting the insurance industry. In a study, Kohonen's Self-Organizing Feature Map is applied to classify automobile bodily injury claims by the degree of fraud suspicion. Feed forward neural networks and a back propagation algorithm are used to investigate the validity of the Feature Map approach. Comparative experiments illustrate the potential usefulness of the proposed methodology. It is shown that the technique performs better than both an insurance adjuster's fraud assessment and an insurance investigator's fraud assessment with respect to consistency and reliability.*

**Full Text:**



**[Headnote]**

ABSTRACT
Claims fraud is an increasingly vexing problem confronting the insurance industry. In this empirical study, we apply Kohonen s Self-Organizing Feature Map to classify automobile bodily injury (BI) claims by the degree of fraud suspicion. Feed forward neural networks and a back propagation algorithm are used to investigate the validity of the Feature Map approach. Comparative experiments illustrate the potential usefulness of the proposed methodology. We show that this technique performs better than both an insurance adjuster's fraud assessment and an insurance investigator's fraud assessment with respect to consistency and reliability.

INTRODUCTION AND BACKGROUND

One vexing problem confronting the property-casualty insurance industry is claims fraud. Individuals and conspiratorial rings of claimants and providers unfortunately can and do manipulate the claim processing system for their own undeserved benefit (Derrig and Ostaszewski, 1994; Cummins and Tennyson, 1992). The National Insurance Crime Bureau (NICB) estimates that the annual cost of the insurance fraud problem is $20 billion, which is equivalent to the cost of a Hurricane Andrew each year (NICB, 1994). According to the National Health Care Association, insurance fraud in health insurance represented an estimated 10 percent surcharge on the U.S. $550 billion annual health care bill in 1988 (Garcia, 1989). A recent Insurance Research Council report on automobile insurance fraud stated that "the excess injury payments as a result of fraud and/or buildup are estimated to be between 17 and 20 percent of total paid losses, or $5.2 to $6.3 billion additional for all injury claims in 1995." (IRC, 1996) Outside of the United States, fraud claims are also increasing. For example, arson was thought to be costing the United Kingdom 500 million a year in 1991 (Wilmot, 1991).

Private passenger automobile bodily injury (BI) insurance is the largest line of property-casualty insurance in the U.S. It is estimated that about 40-50 percent of BI claims, for Massachusetts at least, contain some degree of suspicion concerning fraud (Derrig, Weisberg and Chen, 1994). The proportion of fraudulent claims also appears to be increasing as evidenced by ever higher rates of bodily injury claims per accident. The Insurance Research Council documents a countrywide change from 22 BI claims per property damage liability claim (the proxy for claims per accident) in 1987 to 29 BI claims per accident in 1992 (IRC, 1994). While the entire increase may not be due to an increase in fraudulent BI claims, the increase is indicative of fraudulent or abusive insurance lotteries (Cummins and Tennyson, 1992).

With the awareness of the increasing frequency of suspected claims fraud, more and more rigorous techniques and empirical databases are being created for the purpose of fraud detection. One such database is the National Insurance Crime Bureau (NICB) Database System, which contains 200 million records of claims and stolen vehicles and which was recently made available to member insurance companies (Dauer, 1993). Once a company enters a claim in the database, either the NICB or that company's special investigation unit (SIU) will commence an investigation if some suspicious information arises for that particular claim.1 In Massachusetts, a detail claim database (DCD) of all auto BI claims has been assembled commencing January 1, 1994. This database, available to company special investigative units (SIUs) and the Insurance Fraud Bureau, is expected to provide detailed information on approximately two hundred thousand claims annually.

In addition to databases, people began to use other approaches to analyze the automobile bodily injury (BI) claims fraud problem. Using statistical methods, Weisberg and Derrig (1991) determined the mechanisms behind automobile BI claims fraud, such as relationships between injury type and treatment, for example. Their studies of 1985/1986 and 1989 BI claims found that the overall level of suspected or apparent fraud was about 10 percent of the claims, while the apparent build-up^sup 2^ level was 35 percent in 1985/86 and 48 percent in 1989.

Nearly all companies rely on the training of personnel as the primary method of recognizing claims suspected of fraud. Specified objective and subjective claim characteristics, such as "no witnesses to the accident," have become known as potential fraud indicators or red flags. Three-quarters of the companies rely on the presence of these red flags to assist the claim adjuster in recognizing suspicious claims, and one-quarter of those companies use automated methods of tracking red flags (IRC, 1992).

Studies have also shown that the insurance industry does not share a consensus definition regarding what constitutes claims fraud. Weisberg and Derrig (1993) found that different BI claims handling professionals had ambiguous perceptions of what constitutes BI claims fraud. For example, in a coding of the same set of claims by two sets of adjusters, each set of adjusters classified approximately 9 percent of claims as apparently fraudulent, but ironically only 1.8 percent of the identified claims were simultaneously considered to be apparently fraudulent by both sets of adjusters. Derrig and Ostaszewski (1994) further verified the lack of concordance of the fraud perceptions among different BI handling professionals, such as between insurance company claims adjusters and insurance investigators. In order to study the problem Derrig and Ostaszewski (1994) applied a fuzzy setbased clustering technique. The results of the study again showed the lack of concordance among people with respect to which claims were fraudulent. Based upon their findings, the analysts concluded that the use of an adjuster's judgment, as compared to that of an investigator, can serve well in first-pass screening of BI claims regarding suspicion levels.

Weisberg and Derrig (1993) used regression models to discern which objective and subjective fraud indicators are

more significant than others in effectively identifying suspicion levels of BI claims fraud. If the goal is to identify individual fraudulent claims then their studies exposed several problems. For example, they used only the adjuster's and investigator's subjective assessments of BI claims fraud as dependent variables. As noted above, however, these dependent variables were not consistent with each other, and there was apparent ambiguity and overlap between them. Another problem was that the reliability of each dependent variable couldn't be verified in the real world, due to data limitations.3 Additionally, statistical approaches, including regression methods used by Weisberg and Derrig (1993), have difficulty handling the 65 binary fraud indicators as independent variables unless the sample size is sufficiently large. Thus, based upon correlation analysis, some 25 indicators were chosen as the independent variables in the regression models; the other 40 indicators were not utilized for practical reasons.4 Due to these limitations, Derrig and Ostaszewski (1993) did not use the fraud indicators of claims to extract characteristics of fraudulent claims and construct a screening device directly. Rather, they used fuzzy clustering of multiple suspicion levels pertaining to the accident, the claimant, the insured, the treatment, the injury and the lost wages.

Weisberg and Derrig (1991) claimed that at that time it was premature to address the ultimate goals of quantifying the amount of fraud and developing guidelines for detecting and controlling fraud. Since then analysts studying the automobile BI claims fraud problem have been working to ultimately develop a BI claims fraud detection system or claim classification system. Besides the work done by the Automobile Insurance Bureau of Massachusetts (Weisberg and Derrig, 1993; Weisberg and Derrig, 1996), there have been other attempts in this direction. For instance, Artis, Ayuso and Quillen (1997) model the behavioral characteristics of the claimants and insureds in the Spanish automobile insurance market. An expert system has been developed in Canada "to aid insurance company adjusters in their decision making and to ensure that they are better equipped to fight fraud" (Belhadji and Dionne, 1997). In this empirical study, we intended to apply a different approach to build a BI claim fraud detection or classification system. Specifically, we apply a neural network approach, Self-Organizing Feature Maps (Kohonen, 1982, 1989, and 1990), to construct a claim classification system that uses similar collections of fraud indicators as the classifier.

In the second stage of the study, we do a comparative study between the feature map BI claim classification system and both the adjuster's assessment and the investigator's assessment. Claim adjusters and investigators represent the two primary forces in claim processing and fraud detection. Their expertise will serve as a good benchmark for a novel quantitative approach such as the feature map method. The tool used in the comparative study is another neural network model. Specifically, a feed-forward neural network model combined with a backpropagation learning algorithm. Particularly, we would like to see whether the feature map approach can perform better than the adjuster's and investigator's subjective assessments as measured by the consistency achieved in assessing suspicion levels and clustering BI claims

An overview of the paper is as follows: following this background information, the second section describes the empirical BI claims data used in the study. This data sample is used to construct the feature map models and apply them to BI fraud detection problem in the next two sections. Feed-forward neural network models are constructed to test the feature map approach in the penultimate section. A summary section concludes the paper. The Kohonen's Self-Organizing Feature Map Algorithm is presented in an Appendix.

## BI CLAIMS FRAUD DATA

The data set was generated in a study of Massachusetts BI claims and previously was analyzed by Weisberg and Derrig (1991,1992, and 1993). The entire BI claim data set consists of 127 claims, selected from among 387 claims for accidents in 1989. The data production process was completed in two steps. In a first pass through all 387 claims data, each claim was independently examined by two claim adjusters. Of these, 62 claims were deemed to be apparently fraudulent by at least one of the adjusters. The other 65 claims out of the total 127 claims were randomly sampled from the remaining 325 apparently non-fraudulent claims. In a second pass through the data, these 127 claims were again independently coded, this time by an insurance adjuster and by an investigator from the Insurance Fraud Bureau of Massachusetts. Each claim in the data set consists of a claim ID number, a vector of fraud indicators (we will use claim vector, pattern, and pattern vector interchangeably) and two professional assessments of the suspicion level of fraud, i.e., the adjuster's assessment, and the investigator's assessment. In total, there are 65 fraud indicators which have been divided into six categories based upon the practice used in automobile insurance claim processing: characteristics of the accident, the claimant, the insured, the injury, the treatment and the lost wages. Some indicators, such as the accident characteristics, were based on the police report and witness testimony, while others were collected from actual claim files. Every indicator is a dummy variable and assumes a binary value based upon the answer to a yes-no question. The adjuster's and investigator's assessments, which reflect their opinions of the level of suspicion for the claim, fall into a range between 0 and 10,

with 10 standing for a virtually certain fraudulent claim, and 0 for a virtually certain valid claim. The distribution of their assessments is shown in Table 1. Adopting the convention used by Weisberg and Derrig (1992), we transform the ten-point suspicion level variable into four discrete categories: not suspicious (0), slightly suspicious (1-3), moderately suspicious (4-6) and strongly suspicious (7-10).

It is necessary to emphasize the fact that, besides the subjective assessments of two professionals, there are no so-called observed (true) fraudulent levels available in the data set5. This makes statistical prediction methods, such as logistic regression, impossible to implement in the first place unless we are willing to assume the validity of the professionals' subjective assessments. Not surprisingly, building a reliable dependent variable to measure the level of suspicion is one of the major goals of this study.

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Table 1

We realized that neural network models are normally very computationally intensive. Kohonen Feature Maps, as described in an Appendix, are no exception. Based upon our experience, training a feature map until it reaches a stable state often takes hours on clustered Unix stations. It often becomes too time and resource consuming to conduct extensive experiments based upon advanced sampling techniques. In our first experiment, we thus decided not to do multiple samples or use other advanced sampling techniques. All 127 claim vectors were randomly mixed together before 77, or about 60 percent of the claims, were randomly chosen as the training data set, with the remaining 50 claims used as the holdout data set. We selected a 60:40 proportion for the purpose of having as many claims in the training set as possible but reserved "enough" claims to test the validity of the methodology. The distributions of the professionals' assessments based upon this first sampling in terms of the level of suspicion are summarized in Table 1. We can easily see that the percentage of valid claims perceived by the adjuster and the investigator are comparable. However, among the same 127 BI claims the investigator found more claims to be "strongly suspicious" than did the adjuster. For example, the investigator found 10 more claims (29 versus 19) "strongly suspicious" claims than did the adjuster in the training data set alone. In our second experiment, we took 9 additional random samples from our data set of 127 claims. The size of the training samples was still 77 claims, or 60 percent of the 127 claims. These 9 random samples plus the original sample were run on smaller feature maps (smaller number of output units). With the multiple samplings, the common results are expected to be more robust.

## APPLYING KOHONEN FEATURE MAPS

It must be assumed that if two claims have common or similar fraud indicator patterns, the result would be an approximately equivalent level of suspicion. Consequently, two claims whose indicator vectors have a sufficiently short distance between them should be assigned similar suspicion level values. Hence, if there is a mapping from the claim patterns (vectors) to a suspicion level assessment, such that similar assignments go to the similar patterns and different assignments to different patterns, then we can claim such a mapping system is consistent and reliable. This is the consistency or continuity principle of unsupervised pattern recognition approaches (Schalkoff, 1992).

Cluster Analysis has been a popular method dealing with unsupervised learning problems (lack of observed values of output variables). Statistical software packages such as SAS include various cluster analysis models. Certain optimization criteria are applied to cluster analyses to split a set of observations into a number of groups or a hierarchical **structure**. The distribution of observations among groups is determined by the optimization criteria. Hence, it might happen that one of the groups has a single or very few vectors while another group has 99 percent of the vectors. The application of optimization rules in cluster analysis leads to a lack of control over the numerical **process** that might have better performance if the **process** were interactive and certain a priori knowledge were to be incorporated. In cases where the **data** sample is small but its dimensionality is high, or simply the **data** is quite noisy, conventional cluster analyses might leave little of the necessary freedom for professionals to provide expert inputs into the decision making **process**. Another disadvantage associated with conventional cluster analyses is that it is not easy to identify the groups in terms of the nature of the observations in each group, such as which group represents the "strongly suspicious" **insurance claims** and which group represents the apparently "valid" **claims** in this particular case. Kohonen's Feature Maps (Kohonen, 1982, 1989, and 1990) are capable of dealing with this unsupervised problem while overcoming the weaknesses inherent in conventional cluster analyses. See Appendix for the description of a typical feature map algorithm. For the demonstration, we used an 18x18 square feature map

and trained it for 2,000 epochs. Each cell in the 18x18 map is assigned a random "weight vector" of the same dimension as the claim or pattern vector - namely the number (65 in this case) of fraud indicator variables. The training data set is the one from our first sampling and consists of 77 claims and their accompaning pattern vectors. We know that a distance can be calculated between each cell's weight vector and a pattern vector. For any given pattern vector, we first found the maximum distance among all the weight vectors to the pattern vector and then subtracted each distance from the maximum. The result became a measure of the "closeness" between the weight vectors and the pattern. We then depicted the "closeness" in a threedimension space as shown in Figures 1 through 4. In the graphs, the height of the landscapes measures the "closeness" of the weight vectors to the pattern vector, i.e., the higher the landscape at location (i, j), the better the matching between the pattern vector and the weight vector (or the output unit) at (i, j).

Figure 1 shows the landscape for a claim pattern PA after 2,000 epochs of learning, and adjusting the cells' weight vectors in the manner to be specified subsequently. It is clear that the highest peak lies in the upper corner, which implies that this claim pattern finds its best-matching output unit in that corner. Notice the clear pattern of the landscape decreasing towards the lower corner, this means that the matching between pattern PA and the output units (their weight vectors) gets worse and worse towards the lower corner. It seems from this landscape that the training for the demo feature map was perfectly done. But the next figure shows the presence of noise. Figure 2 is the landscape for another claim pattern, PB. There are two things clearly different in this landscape. First, the highest peak is located at the lower corner. This implies that claim pattern pB might be quite different than the claim PA. Second, besides the highest peak, there are other noticeable peaks, i.e., the landscape does not present a near perfect pattern like the one in Figure 1. This suggests that the training might not have been perfectly executed, or that the training data set contains enough noise to make the identity of this claim ambiguous.

It is interesting to see the evolution of a feature map during the course of training (learning). The landscapes in Figure 3 and 4 were generated for claim pA from the feature map right after initialization and after the feature map had been trained for 200 epochs. Recall that we are particularly interested in the highest peak when we read a landscape. However, we fail to locate a single highest peak on the landscape in Figure 3. It can be easily understood since the weight vectors were initialized with small random numbers. The feature map was thus in a chaotic status initially. However, the chaos should gradually be replaced by a more ordered status as training proceeds. For the same pattern PA, the landscape after 200 epochs (see Figure 4) had already been in pretty good shape. It looks similar to that shown in Figure 1 except that the highest peak in Figure 1 (between 16 and 18) seems much higher than the one in Figure 4 (between 7 and 8). This reflects the fact that the extra 1,800 training epochs enable the feature map to detect or capture this particular claim pattern better.

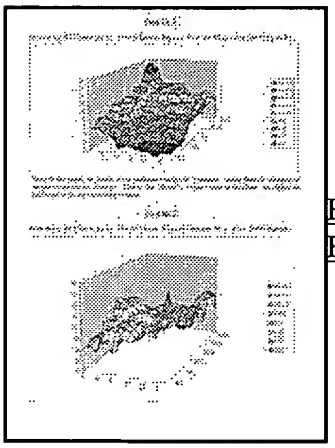

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FIGURE 1
FIGURE 2

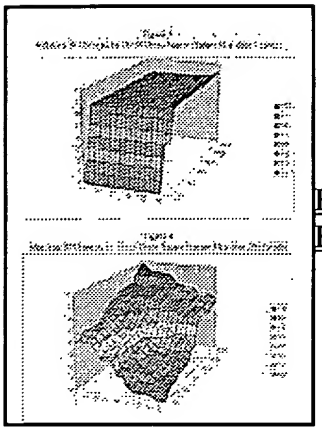

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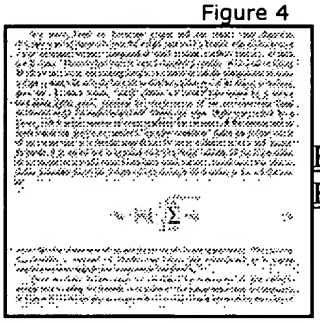
Figure 3

Figure 4



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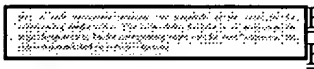

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We now look at this feature map from a different point of view. Assume that there is no external information in terms of the identity of all the BI claims such as the adjuster's assessment or the investigator's assessment but we would like to identify a claim from the feature map. How would such a feature map be perceived or understood, if the feature map has learned from a data sample consisting of a set of independent variables but no observed dependent variable?

Based on the interpretation of the Sm measure, it seems that the small area in black near the upper right corner in Figure 5 is the area for "strongly suspicious" claims. The surrounding area in dark gray might be for "moderately suspicious" claims while the neighboring area in slightly lighter color might be for "slightly suspicious" claims. Accordingly, the "valid" claim zone must be the small area in light color near the lower right corner.

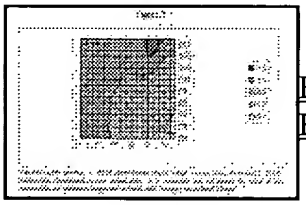

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Figure 5

Next, we would like to identify two different claims, Pc and PD, based upon the interpretation of the feature map illustrated in Figure 5. Similar to the process of generating three-dimension landscapes as described previously, a value measuring "closeness" was calculated between each weight vector and each claim pattern. The "closeness" values were displayed in Figures 6 and 7 for claims pc and PD. In each graph, the darker the color at an intersection, the closer the corresponding weight vector to the claim pattern. In Figure 6, we see that the darkest area for claim pc is close to the upper right corner. This area was designated as "strongly suspicious" area from Figure 5. This suggests that claim pc (see Figure 7) ought to be considered "strongly suspicious." In contrast, claim PD is more likely to be a "valid" claim. Incidentally, the adjuster gave claim PC a "7" as its suspicion level while the investigator's mark was "10." However, both the adjuster and the investigator thought claim PD was valid, i.e., gave "0" as its suspicion score. Readers are reminded here that what we have done so far is just an illustration. Formal evaluations are made below.

AN APPLICATION OF FEATURE MAPS TO BI FRAUD DETECTION Based on our past experience, in order to achieve a good mapping effect, the number of output units of a feature map is usually four times (or more) the number of training pattern vectors. Thus, we designed a 20x20 two-dimensional output map to match against the training sample composed of 77 pattern vectors. These 400 neural units were arranged in the form of a square. A square feature map form was selected because of its simplicity and tractability. Higher dimensional feature maps are possible but we sacrifice the intuitive graphical realizations of Figures 17. We used the algorithm described in the Appendix, to train the feature map for 2000 epochs.

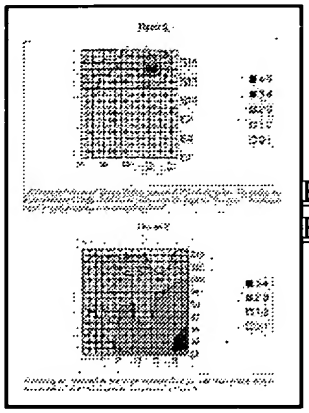

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Figure 6
FIGURE 7

Since it is a square feature map, we chose a 20x20 table to represent the feature map, with each cell representing an output unit. Each claim pattern has its best-matching output unit. We displayed the matching between the claims (their ID numbers) in the training data set in Figure 8. Since each claim in the data set had been assigned a suspicion score by the adjuster and the investigator. Figure 9 and 10 display the adjuster's assessment and the investigator's assessment, respectively. Let's call those figures the ID map, adjuster map and investigator map for the training data set. Each claim in the holdout data set also has its best-matching unit. Figures 11, 12 and 13 are the ID map, adjuster map and investigator map for the holdout data set. Figures 8 through 13 were generated after the training for the feature map had terminated, i.e., after 2,000 epochs.

We could have produced a three-dimension landscape for each individual claim vector. We could also have produced two-dimension graphs as we did in the third section. Instead, we chose to generate the mapping for the whole training set or the whole holdout set. By generating adjuster maps and investigator maps, we could see the overall distribution of their assessments. A well-trained feature map is supposed to provide order rather than disorder for the fraud indicator clustering in mapping. But this is not necessarily true if the adjuster's assessment or the investigator's assessment, unless their assessments are about equal. Accordingly, the map for the adjuster's assessment becomes a measure of how well or how consistently the adjuster and investigator did in evaluating the BI claims. Both the adjuster and the investigator are experienced claim experts. Their evaluations of the possibility of fraud or suspicion level might prove to be less than perfect but their expertise will certainly be of great value. Although we are able to produce an individual landscape for each claim in the data set and find the location of its highest peak, we still have to identify a claim whose highest peak is located in the upper-right corner as well as one whose peak is located in the bottom-left corner. We expect that the maps of the adjuster's assessment and the investigator's assessment provide such an explanation.

From Figures 9 and 10, it is clear that the larger numbers, indicating higher suspicion level assigned by the adjuster to the claims in the training data set, tend to concentrate in the upper-right area while zeros are mostly distributed in the lowerleft area. Hence, these two feature maps on the training data set suggest an overall pattern that "strongly suspicious" claims are most likely to find their "peak" or "best-matching" output unit in the area of upper-right corner and its neighborhood. The suspicion level of the claims to be mapped diminishes gradually towards the opposite corner where the output units act like the magnets abstracting "valid" claims.6

In Figure 9, however, three 8's were mapped onto the "valid" area (see the row at the bottom). It seems difficult to untangle the 8's from O's since the claims they represent are mapped to the same output unit or nearby units. Similarly, a few 7's, 8's and 9's are spotted in the lower-left area while a few O's sneak towards the upper-right corner in Figure 10. These may be the outliers and do not disguise the overall image. Or, these might be evidence that the adjuster and/or the investigator did not assign indicators and suspicion scores consistently within the training data set.

Recall that claims Pc and PD were picked works in Section 3 to show how quantity S^sub m^. We speculated that claim Pc might be "strongly suspicious" and that claim PD "valid" from the perspective of that 18x18 feature map. Here, we find again from Figure 8 that claim pc, or #12, is in the "strongly suspicious" area (see the cell in top-right corner) while claim pD, or #69, (see the 7th cell at the bottom) is considered to be a "valid" claim from this 20x20 feature map.

Finding an overall pattern from Figures 12 and 13 (on the holdout data set) becomes difficult. Although we might still consider the upper-right corner in Figure 12 as the area for "strongly suspicious" claims and the opposite corner is for "valid" claims, the picture is much more vague, as compared to Figure 9. One of the reasons might be the imbalance of the sampling. The claims that were deemed by the adjuster as having high suspicion level (from 7 to 10) account for only 10 percent in the holdout data set while it is 25 percent in the training data set (see Table 1). Hence, the vague image in Figure 12 might be because the number of "strongly suspicious" claims in the holdout data set is not enough for the group to distinguish itself in a single random sampling. An apparent reason is that the performance in extrapolation seems logically inferior to that in interpolation. Presumably, the overall pattern is more ambiguous when the holdout data set is applied. The extrapolation image seems to be more satisfactory when the investigator's assessment is used as the label (see Figure 13). Not surprisingly, Table 1 shows that the distributions of suspicion level by the investigator are more comparable between the training data set and the holdout data set. It also seems clear that, compared to the one from the training data set, the investigator map from the holdout data set seems less ordered, as evidenced by that a few more large suspicion scores can be found in the lower-left area in Figure 13.

In Section 3, we showed that without the help of any external knowledge, a feature map model could be constructed to understand BI claims in a unique way, as shown in Figure 5 through Figure 7. In this section, we showed that with the help of the adjuster and the investigator's assessments, or the operation of an outcome feedback loop, a claim could be roughly identified or categorized on a feature map. Furthermore, a feature map provides a mechanism for evaluating those subjective assessments. For instance, we found that the adjuster and the investigator did not assign the suspicion level to those BI claims in a random fashion. The overall distributions of the claims' suspicion level suggest that these two experts evaluated the claims' level of suspicion in a somewhat consistent, but apparently less than perfectly consistent, fashion.

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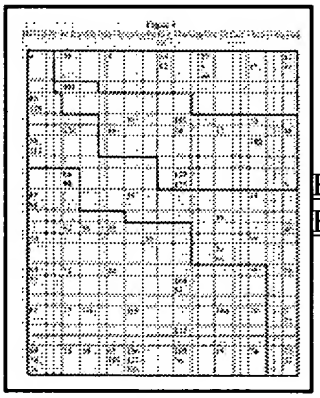

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Figure 8

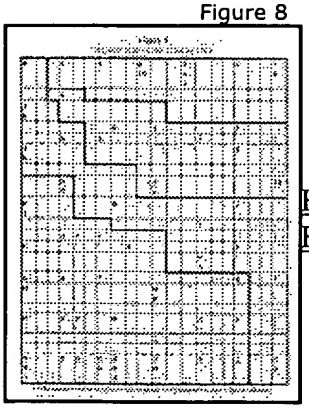

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Figure 9

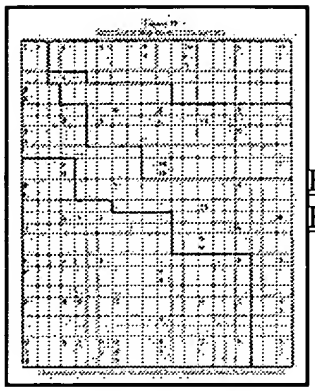

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Figure 10

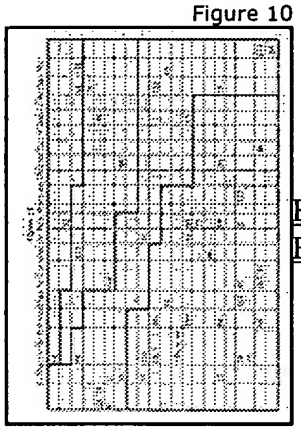

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Figure 11

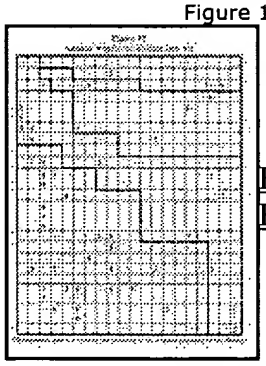

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Figure 12

It is instructive to construct a test and compare the feature map approach with the experts' claim evaluations. As we know, the adjuster's assessment and the investigator's assessment represent the subjective suspicion level assigned to the claims. Hence, each of their two assessments becomes a dependent variable, a variable depending upon the 65 fraud indicators. To do a fair comparison, we have to construct a dependent variable from the feature map. With this dependent "suspicion" variable, the next task is to find a way of doing the quantitative comparison between the three dependent variables. Constructing a variable measuring the suspicion level of BI claims from the feature map point of view and finding a model to do a comparative study are the two things to be accomplished in this section.

suspicious" and the output of a neural network model is 4 ("strongly suspicious") as its output for the claim, the correct classification is obtained by the neural network model on the claim. A correct classification rate for a data set equals the number of correctly classified claims divided by the total number of claims in the data set. The correct classification rates shown above are the average over four neural network models.

Feature Map Categorization

The professional assessment maps shown in Figures 9 and 10 present an overall tendency of claim suspicion level, i.e., high at the upper-right corner and low at the opposite corner. Hence, we can label the claims mapped onto the upper-right area as "strongly suspicious", those onto the lower-left area as "valid." "Moderately suspicious" and

"slightly suspicious" zones can be identified from the feature map accordingly. However, only if the feature map is split into four regions, with each output unit (a cell in Figures 8 through 13) belonging to exactly one of the regions, can such a numerical variable be defined. The variable for a claim assumes a value of "4" if the claim finds its best-matching unit in the "strongly suspicious" region, "3" if in the "moderately suspicious" region, "2" if in the "slightly suspicious" region, and "1" if in the "valid" region.

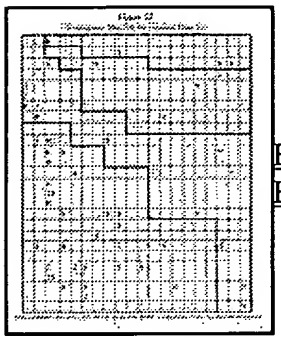

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Figure 13

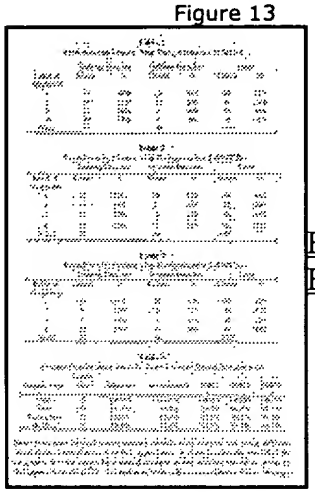

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Table 2
Table 3
Table 4
Table 5

We drew "borders" in Figure 8 to split the feature map into four regions. The feature map separation was made with the following considerations: First of all, the adjuster map and investigator map (Figure 9 and 10) suggest the general trend of suspicion, i.e., "strongly" at the upper right corner and "valid" at the lower left corner. Secondly, it is thought that the "strongly suspicious" claim group, in reality, accounts for roughly ten to fifteen percent of the BI claims while about half of the BI claims appear to be valid. No scientific method was used as guideline for this exercise.7 The final categorization was thus obtained as shown in Figures 8 through 13. A feature map claim categorization variable was thus defined. We define this as the feature map categorization (FMC1). The summary on FMC1 is shown in Table 2.

From Table 1, we know that the adjuster and the investigator gave very different views about the suspicion levels over the data sample. For instance, the investigator found more claims to be "strongly suspicious" than did the adjuster. One reason for the lack of concordance between the adjuster and the investigator can be explained by the manner in which different types of insurance professionals perform their job. Usually, investigators tend to either provide hard evidence in order to convict fraudulent claimants or assume validity if the claim under investigation is only slightly suspicious. Hence, the distribution of assessments given by investigators tends to concentrate on the two ends, i.e., apparently fraudulent and valid. However, insurance claim adjusters have a greater degree of freedom; for example, if they consider a claim to be even slightly suspicious, they still hold some bargaining power and can take an aggressive strategy in negotiation. To obtain a fair comparison between the feature map categorization method and a professional's assessment, we adjusted the borders twice in this study. Based upon FMC1, we adjusted the borders in Figure 8 and Figure 11 to obtain FM Categorization No. 2, or FMC2. Specifically, we moved the three zigzag lines towards the lower-left corner to have higher densities for higher levels of suspicion categories. This adjustment was intended to produce a distribution of claim suspicion level by FMC2 (see Table 3)

that is similar to one by the adjuster's assessment (see Table 1). Similarly, the zigzag lines were further moved down towards the lower-left corner in order to obtain a distribution of claim suspicion level by FMC3 (see Table 4) which approximates that of the investigators' assessment (see Table 1). Consequently, the percentage of strongly suspicious claims in FMC3 is even higher than that in FMC2. Likewise, the percentage of strongly suspicious claims in FMC2 is higher than that in FMC 1.

Validation by Feed-Forward Neural Networks

Although the main purpose of this study was to search for a quantitative model for us to better identify the suspicion level of BI insurance claims, how well the model performs remains to be tested. Verification from practice is not available. Otherwise we would have used this knowledge in building (possibly different and better) models. One way to validate this new method is to see whether it performs consistently or more consistently than did the adjuster and the investigator approach.

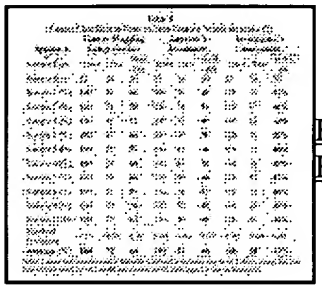

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Table 6

Suppose that the learning algorithm is back-propagation (Rumelhart et al., 1986) that the transformation function is sigmoid shaped and that the number of hidden units is sufficiently large. Then, it has been proven in numerous publications (Hornik and Stinchcombe 1989; Hornik et al., 1990) that a standard feed-forward neural network with one hidden layer can be a universal approximator for virtually any function of interest. It is also widely believed that human decision making (such as providing a claim suspicion level), is both a nonlinear and continuous process. Accordingly, a three-layer feed-forward neural network, using the back-propagation algorithm, was chosen as the validation model.8 Such a model will produce the comparative results between the feature map categorization and the adjuster's/investigator's assessments. In fact, a side benefit is that the feedforward network can be used as an alternative approach to the feature map approach. Thus, the numerical values of the feed-forward neural network model might be more acceptable to claim processing practitioners, if interpreted as suspicion level or possibility of fraud.

We used NeuralWorks Predict (a commercial neural network software from NeuralWare, Inc.) to do the validation. All three feature map categorizations (FMC1, FMC2 and FMC3 from the 20x20 feature map) were compared to the adjuster's and investigator's assessment. NeuralWorks Predict uses sophisticated learning algorithms. One feature of the software package is that the software has a built-in genetic algorithm that helps find the optimal three-layered feed-forward neural network. Another nice feature is that the learning process is closely monitored in the sense that there are two data sets involved in the process, i.e., a training set and a testing set. The training data set is used for the purpose of training the model and the other one, the testing set, is used to test whether the training should stop. In this experiment, the 77 claims in the first random sample were further split into the training set and the testing set while the remaining 50 claims were withheld from the training process and used for the purpose of extrapolation. Remembering this point will help when reading Table 5 (and later Table 6). Table 5 presents the results of a comparison between the two professional's assessments and three feature map categorizations (FMC1, FMC2 and FMC3).

There are a few things worth mentioning in Table 5. First, it is obvious that the program was able to construct a neural network identifying all 53 claims for each of the five approaches. Second, adjusting the decision boundaries does make some difference since the correct classification rates on the testing set and the holdout set from FMC2 are lower than those from FMC1 and FMC3. On this subject, statistically sound evidence is not available although it might prove to be another interesting issue for further study. Third, the adjuster seemed to evaluate the claims more consistently than the investigator did since the correct classification rate of the adjuster's approach is 52.5 percent versus 43 percent for the investigator's approach on the extrapolation. And finally, moving boundaries in an appropriate way does not change the fact that the feature mapping approaches do have an advantage over the two professionals' subjective approaches.

To achieve more statistically significant results, we used nine other random samplings to produce training and holdout data sets in each sampling. In each sampling, fifty claims were reserved in the holdout set while the remaining seventyseven were used as the training set for the feature map training and were split into the training set and the testing used in NeuralWorks Predict for training. We designed ten 15x15 squared feature maps, with each feature map corresponding to a sampling, and trained them for two thousand epochs.9 Rather than experiment with multiple region separations on each feature map, we drew separation lines on each feature map only once. For each random sampling, we have three approaches to compare, i.e., the feature map, the adjuster's assessment and the investigator's assessment. Table 6 summarizes the validation results produced by NeuralWorks Predict.

From Table 6, we can basically make similar points to the ones we did on the results from Table 5, i.e., the feature map approach out performs the adjuster's approach, which out performs the investigator's approach in terms of consistency in evaluating BI insurance claims. Specifically, the feature map approach overwhelms the other two approaches in terms of correct classification rates within the combined training and testing sets and over the holdout sets (in spite of a couple exceptions). An average rate of 64 percent was achieved on the holdout data sets for the feature map while the average rates for the adjuster and investigators approaches are only 46 percent and 42 percent, respectively. Furthermore, a 74 percent correct classification rate was obtained for the feature map approach on the holdout set from sampling # 9. However, the highest rate on the holdout sets is at 60 percent for the adjuster's approach and only 48 percent for the investigator's approach. This suggests the great potential of the feature map approach in classifying BI claims, especially when one considers that an even higher rate could be achieved if the borders to partition the square feature maps were drawn usg some type of on rather than subjectively.

## CONCLUSION AND: DISCUSSION

With BI claim characteristic vectors consisting of 65 potential fraud indicators and no true dependent variable regarding fraud (or suspicion), the fraud detection problem becomes a challenging issue. The Kohonen Self-Organizing Feature Map can be used as a fraud detection or claim classification approach. Moreover, we have found that this new method out performs the insurance adjuster's and the insurance investigator's assessments of fraud for the same claim files, as verified by the multi-layered feed-forward neural network. The study presents two alternative neural network approaches in classifying BI insurance claims in terms of their suspicion level, feature maps and feed-forward networks derived from the feature maps. The first approach is capable of producing visual images for individual claims, such as a landscape as shown in Figures 1 and 2 or a planar graph shown in Figure 13 through Figure 15. A derived feed-forward neural network is able to provide numerical outputs or suspicion scores. Fuzzy clustering of the weight vectors may help here (Derrig and Ostaszewski, 1994).

There are a few observations. First, our conclusion concerning the superiority of our new methodology partially depends upon the neural network verification. Although NeuralWorks Predict is robust enough for the conclusion drawn in this comparative study, it is possible to find a better network structure and training parameter design than those used in this empirical study. For instance, we have seen in Tables 5 and 6 that the correct classification rates on all the training sets are 100 percent.

Another concern is the determination of the decision regions. Splitting the feature maps, we used not only the knowledge from the adjuster's and investigator's assessments but also the rough proportion of each suspicion level in the sample. We did an exercise in drawing three separation lines on one of the feature maps and all three feature map categorizations did produce better results than the adjuster and the investigator. However achieving the optimal feature map categorization deserves further investigation.

Concerns may be raised regarding the assumption that categorization is determined completely by fraud indicators, with all 65 indicators being equally weighted in the feature map models without data preprocessing. In the real world, some indicators might be more important than others. For example, Weisberg and Derrig (1993) show that unequal weights, ranging from one to three, arise in the regression modeling of adjuster suspicion levels by fraud indicators.'w This concern implies a further research direction where statistical or case studies and the use of hybrid models (Goonatilake and Khebbal, 1995) may provide insights.

The correct classification rates on the holdout data sets are in the neighborhood of 64 percent (Table 6). Improvement seems to be quite possible and necessary because of the following reasons. First of all, obtaining a one percent increase in the correct classification rates means a saving of millions of dollars to the insurance industry as insurance fraud has become a multi-billion dollar business (IRC, 1997). Secondly, a preprocessing screening of fraud indicators might lead to a comparable performance by the feature map approach with a smaller number of indicators, collecting variables itself costs money. Building a comparable model using a smaller number

of variables is another way of saving claim-handling costs. Thirdly, a data sample containing 127 claims is small. A model built upon a larger data sample would certainly improve the correct classification rates on the holdout set since the holdout set would be more similar to the training set as they both get larger.

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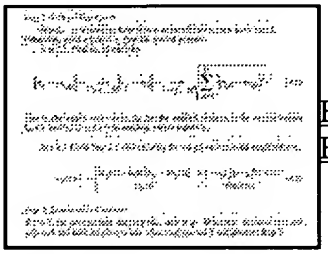
APPENDIX



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**[Footnote]**
1The Insurance Research Council reported that about half the property and casualty premium volume was written by companies with special investigative units (SIUs) (IRC, 1984). Given the recent increased emphasis on fraud detection, the establishment of SIUs has expanded greatly. In Massachusetts, for example, all companies writing private passenger auto as a servicing carrier must establish an SIU.
2 The term "build-up" is defined as an attempt on the part of the claimant and/or the health provider to inflate the damages for which compensation is being sought (Derrig and Ostaszewski, 1994).

**[Footnote]**
3 Unlike other fraud detection problems, such as credit card fraud, most automobile bodily injury claims cannot ultimately be verified. It is either too costly or impossible to determine and classify without doubt a fraudulent BI claim unless a reliable court decision is available. However, insurance companies tend not to resolve a claim in this manner because it is both risky and costly. As a result, the data used by Derrig, Weisberg and Ostaszewski, and in this study, consists of only objective and subjective indicators or subjective assessments and are not based upon the legal conclusions of whether or not legal fraud was probably present with respect to the BI suspected claims fraud.
4 For logistical and expense considerations, real company claim operations may be more inclined to track from 10 to 25 indicators systematically rather than 65 indicators. Hence, parsimonious solutions may have more practical value.

**[Footnote]**
5 It is normally true since an insurance claim is rarely identified in practice as a fraudulent claim unless some extensive special investigation and/or legal procedures are involved.

**[Footnote]**
6 Note that the interpretation of the 18x18 feature map shown in Figure 1-7 is slightly different from that of this 20x20 feature map. This is mainly because (1) training feature map is a stochastic process and (2) the quantity Sm, which is analogous to counting fraud indicators, may not be equivalent to the approaches the adjuster and investigator used in the evaluation of BI claim suspicion.

**[Footnote]**
7This assignment would be accomplished in a pratical application by further testing or by a feedback

loop from actual outcomes.

**[Footnote]**
8 A similar model was used in Brockett, et. al. (1994) in a study of predicting insurance insolvency.

**[Footnote]**
9Here, the feature maps are smaller than what we had used in the first experiment, which is 20x20. The only reason we did this was to save resources while we hoped our conclusion would be conservative if these smaller feature maps produce consistently better results from the feed-forward neural network validation, compared to the adjuster's and the investigator's map.

**[Footnote]**
eisberg and Derrig (1993), Appendix F, Table 111.1, p. 156.

**[Reference]**
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